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THE IRON AGE

THE NATIONAL METALWORKING WEEKLY August 10, 1950

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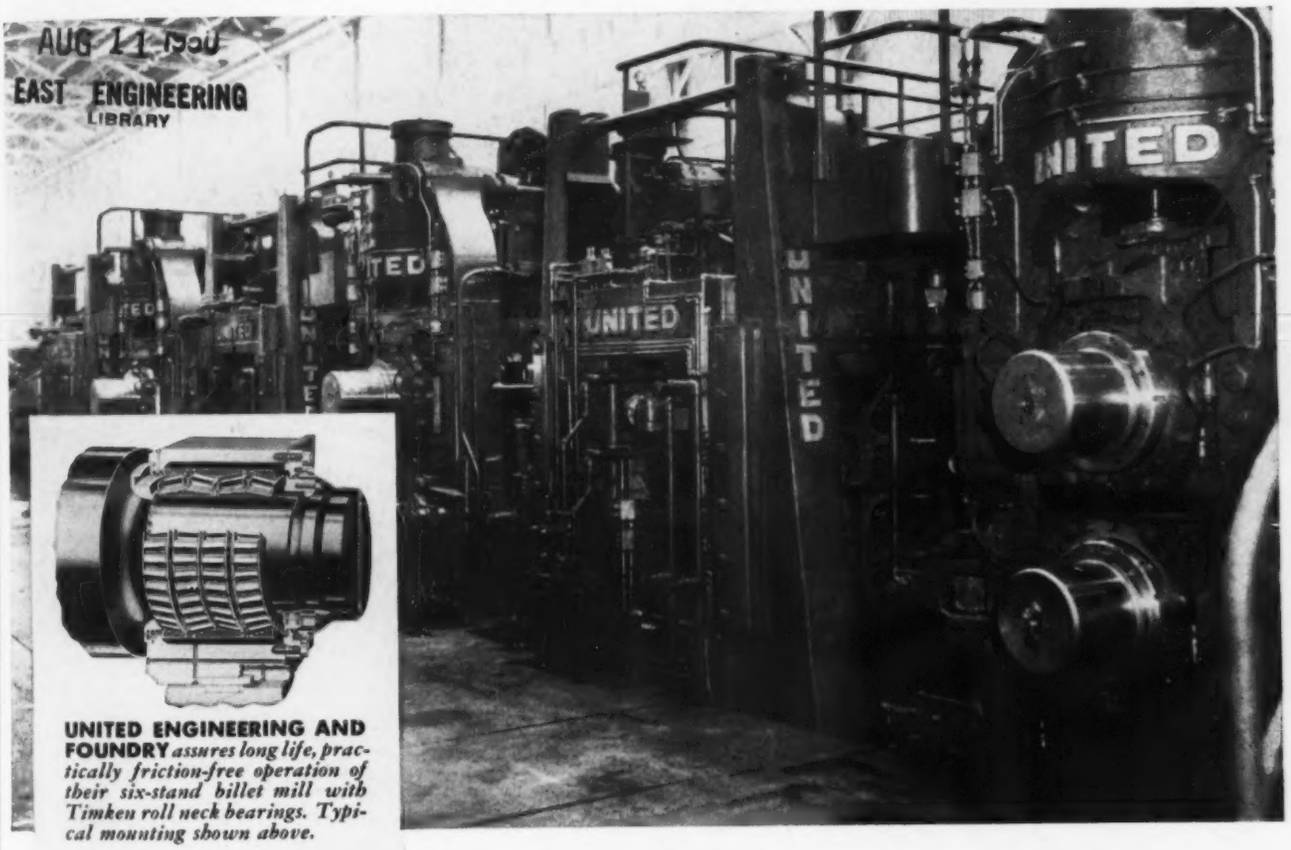

UNITED ENGINEERING AND FOUNDRY *assures long life, practically friction-free operation of their six-stand billet mill with Timken roll neck bearings. Typical mounting shown above.*

How to keep a roll neck from becoming a bottleneck

TO insure continuous production and long, trouble-free performance, the rolls of this United six-stand billet mill are mounted on Timken® roll neck bearings. By reducing friction, Timken bearings permit higher rolling speeds, eliminate roll neck wear.

Tonnage records indicate that the long life of Timken roll neck bearings keeps bearing cost per ton of steel rolled to a minimum. Thanks to balanced proportion design, Timken bearings give greater mill rigidity, permit larger diameter roll necks than ever before possible with tapered roller bearings. Roll neck strength is increased 50 to 60%. Load ratings are increased up to 40%.

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Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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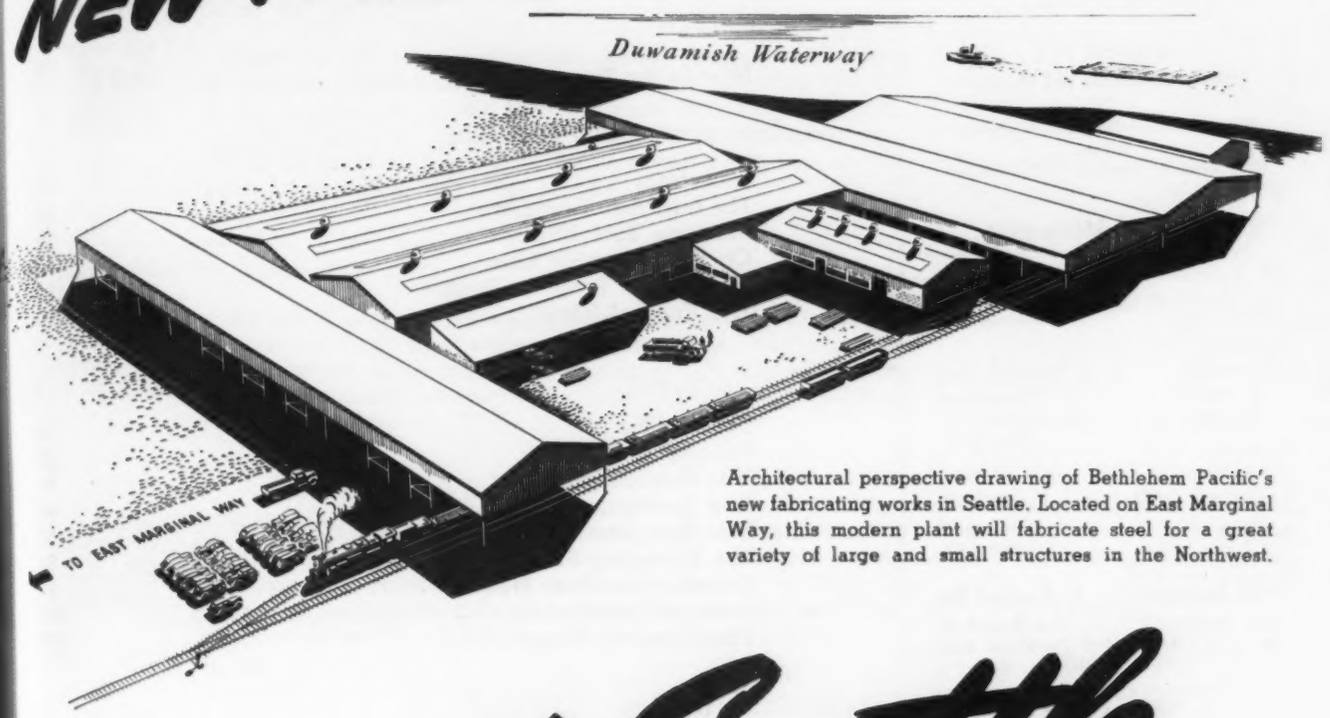
So whatever your need, consult Cleveland. Sales representatives in all major industrial centers are at your service, to help you select correct types and sizes and discuss any phase of your power transmission problems.

Write for the latest Cleveland catalog, indicating your requirements. The Cleveland Worm & Gear Company, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Drives

NEW FABRICATING WORKS at Seattle



Architectural perspective drawing of Bethlehem Pacific's new fabricating works in Seattle. Located on East Marginal Way, this modern plant will fabricate steel for a great variety of large and small structures in the Northwest.

Bethlehem Pacific has backed its belief in the future growth of the Industrial West by building a new structural fabricating works in Seattle. This plant, along with Bethlehem Pacific's other fabricating works at Los Angeles, Alameda, and South San Francisco, gives the company an extensive network of facilities for fabricating steel for buildings, bridges, galvanized transmission towers, and miscellaneous structures.

The Seattle Fabricating Works marks another step toward completion of Bethlehem Pacific's expansion and improvement program that has been underway for several years.

An integrated organization, Bethlehem Pacific now owns and operates 3 steelmaking plants complete with rolling mills, 3 bolt-and-nut plants, and 4 fabricating works to turn out the large variety of steel products needed by industry and commerce in the West.

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THE IRON AGE

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Special Article

Russia's own steel production outside of Eastern Europe is meagre. Manchuria and North Korea are thus of immense importance to the U.S.S.R. since they form the only promising base for large-scale steel production east of the Urals. Manchuria and North Korea could become a major Soviet-dominated industrial empire.—p. 65.

Issue Highlights

Better jet engines are being developed mainly by design changes, though new alloys, heat treatments and processing changes have helped. Promising new developments are minimization of thermal shock and high frequency vibration testing.—p. 73.

Very light-sectioned castings can be produced in ductile iron. This material has been used with excellent results in large production runs of castings weighing as little as 3 oz with sections as thin as 3/32 in. Experiments have developed annealing techniques to give maximum ductility.—p. 79.

Consumption of flat-rolled steel in this country has increased 80 pct in the past 10 years. Considering population increases, consumption by the average American has risen 62 pct. But steel producers are still trying to catch up with demand for their flat-rolled products.—p. 87.

Iron ore shippers, sour-weathered into a month-late start last spring, are racing against time to bring down 75 million tons of ore this season. Canadian bulk carriers are helping, and some ore is being moved all the way by rail. Shippers are hoping for a late fall and an early spring.—p. 88.

Industry is again facing the twofold task of gearing up production and trying to preserve and increase its labor force. First indication of what the government thinks is essential is the Dept. of Labor list of critical occupations.—p. 91.

Coming Next Week

Formation of unprotective oxides on high-temperature steels causes continuous oxidations. The trouble comes from contamination of the original oxide phase by oxides of vanadium, lead, tungsten and other elements. This accelerated oxidation has been stopped on a laboratory scale by minimizing contamination and adjusting alloy composition. Success is of great importance to jet engine industry.

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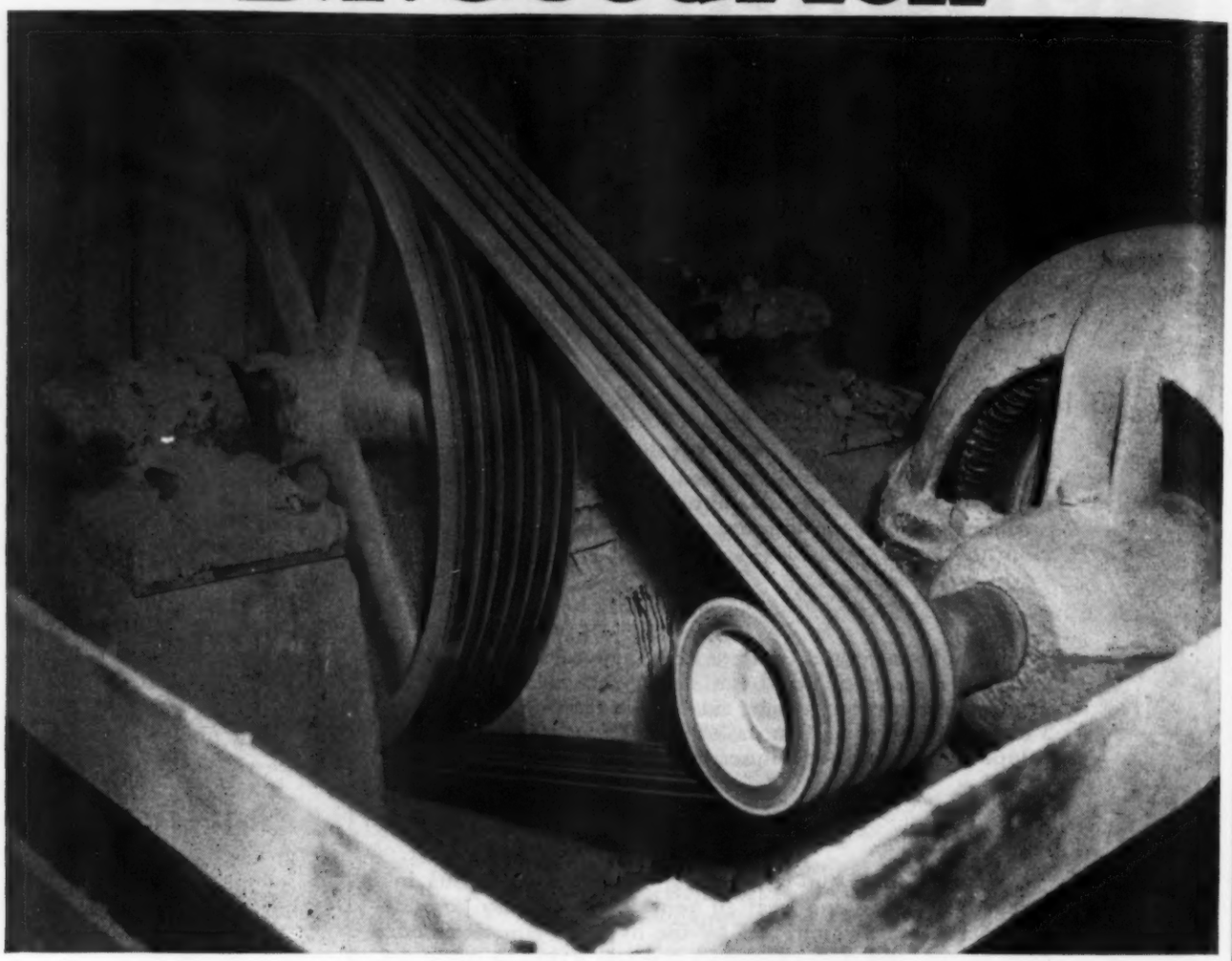
Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries $25 per year. Single Copies 35¢. Annual Review Number, $2.00.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Where a change to grommet V belts saved $100 a month

THIS drive turns a ball mill containing 22 tons of steel balls, water and ore that grind until the mineral can be separated. Six ordinary belts weren't enough. They were falling to pieces from overwork.

But there wasn't space to expand, and redesigning the drive would cost $800. Ordinary belts lasted only 5 or 6 weeks, replacement costs were over $100 a month. B. F. Goodrich grommet multiple-V belts were installed, are in their sixth month of service, still in good condition. Here's why the grommet construction reduces V belt costs:

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B.F.Goodrich has the grommet! — No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). At present made in D and E sections only. See your local B. F. Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

Editorial

INDUSTRY VIEWPOINTS

Now Is The Time

A LOT of people think propaganda is bad. It isn't all bad. There is good propaganda: Messages that inspire; words that draw pictures; talks that bring home the truth.

The other day I was talking to a civilian who had been a colonel in Iran. He knows the Eastern people. He also knows the Russians.

I asked him "What and where have we failed the most in telling the American people the facts?"

Quickly he said, "It's not the question of preparedness. That is important. It isn't the failure to keep armed to the teeth. That's important too. Thank God we are starting to do it. It is something far more simple that we have failed in."

"All right," I said, "Let's have it in simple words."

"The greatest sin the government and industrialists, who know, have committed is to fail to tell the American people how lucky they are," my friend said.

"What do you mean, lucky?"

"Well," he said, "not more than one American in ten knows what the American way of life means. He does not know what poverty, starvation, frustration and hopelessness abide in other countries. He does not know how well off he is. Nor does he know how close we have come to losing all this."

We talked and then decided that those who know should tell. Why not good propaganda! Why not a message or a motion picture about how the slave states live —followed by how Americans live?

Do our people realize that the Communists care nothing about 1 or 2 million lives? That they would as soon fill a ditch with corpses as dirt? That they care nothing about ethics, morals, religion or fair play?

If Americans—people and industry combined—really knew what they were up against there would be no business or politics as usual.

That was the message of my friend who soon may have to leave a job, a wife, three kids and a home to prove that the American way is the best.

Let's have the other side of the picture for our own people. Now is the time to tell how the other people live—what slave states are. What lack of freedom means. What happens when a dictator gets an idea. We are lucky but our luck is running out. We need understanding, support and realistic thinking.

Now is the time for propaganda to Americans about how lucky are Americans!

Tom C. Campbell

Editor

DANLY PRESSES

PAY OFF AT HOTPOINT—

. . . in plant 5 at Milwaukee where press work is the key to efficient, high speed production of electric water heaters and automatic dishwashers.

DANLY PRESSES SET THE PACE on the line that mass produces these 33 gallon water heater tanks. Extra heavy Danly frame construction assures the steady, day after day press performance that makes a picture like this possible. At Hotpoint, press operations are a vital factor in nearly all production.

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► One of the first good-sized armament orders to use flat-rolled steel is now on the books for 500,000 "blitz cans." The Army is now talking about boosting the quantity to 2 million. This activity in 5-gal gas and water cans should be good news to stampers--during the last war almost every plant that had a press had a piece of this business.

► An experimental machine has been developed to simulate service conditions involving abrasion. It allows evaluation in a matter of minutes instead of months required in actual service.

► Conversion ingots are now sold out for the balance of the year and pressure is on mills to take orders for the first quarter of 1951. The current $80 a ton price is not expected to hold.

An importer was offering electric furnace forging billets at $120 a ton late last week in New York.

► A business machine manufacturer is now making its own powdered metal parts. Until recently it bought them from a custom molding shop.

► A Chicago steel company is experimenting with an unusual type of steel house construction using cellular steel panels. A few experimental houses have been erected but excessive demand for the company's regular products prevents it from going into the field on a large scale.

► Britain has just started operating what is believed to be the first high-top-pressure blast furnace outside the United States.

► The Quartermaster Corps is placing new orders very fast. It is saving time by reordering World War II materiel. Ordnance is much slower. The difference is that you can cook on a 1941 model stove but a lot of World War II ordnance materiel is dangerously outmoded.

► What is believed to be the first barge load of ingot molds will soon be shipped from Sharpsburg, Pa., to Alton, Ill.

► The Navy's stockpile of machine tools is in pretty good condition--they have already been rebuilt and reconditioned where necessary. The Army has some tools in readiness but the Air Force has a pretty sick pile of machine tools.

The services have control of these tools--under present rules--until M-Day and they will not be released from JANMAT reserves for rebuilding. Not unless someone wakes up.

► Gray market cold-rolled steel sheets have just hit what is believed to be a new high for the year in St. Louis and Peoria. Price: $270 per ton.

► Privately, steelmakers are burned up at one of their good customers: the railroads. The roads are putting their hands into the steel pot just when everyone else wants steel--and just too late to avoid some bad headaches on steel shipments because of a car shortage.

► A simple technique now tests brazability of cupro nickel specimens. Using the correlation between surface brightness and brazability it checks this material for a maker of heat exchangers to avoid rolling material that would later prove impossible to braze.

We changed from steam to an **Industrial Brownhoist Diesel Crane**

It paid for itself in four years!

Here are the figures to prove it:

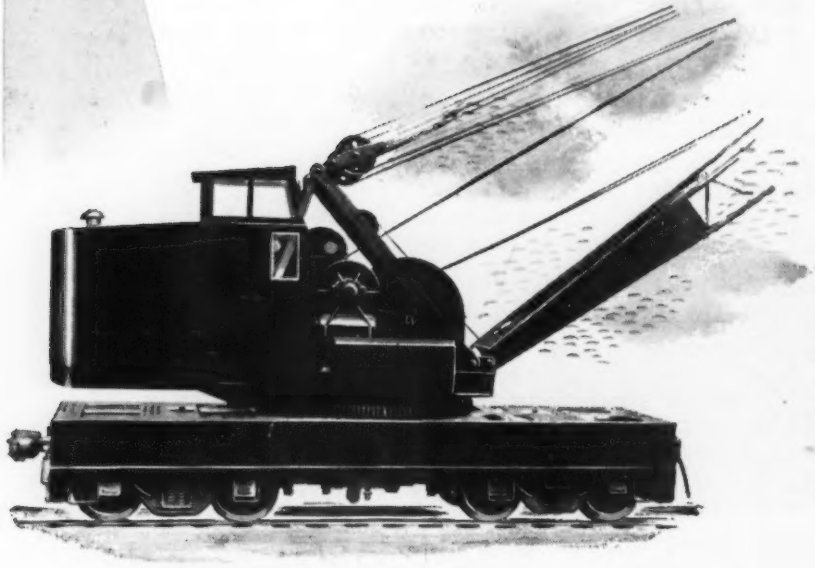
SAVINGS IN FUEL PER DAY $13.40
(Based on 1½ tons coal per day at $10 a ton, against 16 gallons of fuel oil at 10¢ a gallon.)

SAVINGS IN LABOR PER DAY $15.50
(Unproductive firing, banking, cleaning time — 2 hours for engineer at $1.75 per hour, and 8 hours fireman, at $1.50 per hour.)

TOTAL FUEL AND LABOR SAVINGS PER YEAR.. $7,514.00

AND WE INCREASED OPERATING TIME BY 65 DAYS A YEAR!

It takes two hours a day on the average for firing up, banking, taking coal and water, boiler washouts, etc. That figures to 10 hours a week, 520 hours a year, or 65 extra days of productive crane time each year.



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Steel Procurement A Big Job

Defense Orders Slow to Come

Scrap Prices Spurting Again

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

STEEL buyers are taking every ton of steel they can get their hands on and reaching out for more. Some of them are operating under firm instructions to procure all available tonnage from a variety of sources—provided the price is "reasonable." Many consumers have again decided that steel inventories are better than money in the bank; and some apparently have decided that extra steel is like "interest" on their money.

Only the very lucky or the ingenious will be able to collect such "interest." There is practically no chance that consumers will be able to boost their steel quotas for peacetime production. With steel items already on informal allocation by the mills, the only way a consumer can get more steel from the mill is by obtaining defense or essential orders or by showing a history of steel buying far out of proportion to his present quota.

Procurement Seen Important

Foreign mills, conversion and gray markets have all been pretty well exploited by ingenious or desperate steel buyers. The cream from these sources has already been skimmed off. There is no doubt that they have played a vital role in keeping the operations of some plants at a high level. They still are. Some consumers curse their high priced sources of supply in one breath and bless them in the next.

Steel procurement is going to be a major problem for most manufacturers for a long time. Recognizing this, some firms have already put their most able men in these jobs.

Meanwhile both producers and consumers are anxiously waiting for the government to formalize voluntary allocation of steel. The Industry Advisory Committee has already been selected, but will not begin to function until government machinery to administer the voluntary plan has been freed for action.

Steel people who had been awaiting a government pronouncement on requirements and distribution before opening their fourth quarter order books are becoming impatient. Two big producers are now taking orders for the fourth quarter, even though they realize they are running the risk of having to remake their order books. Buyers have been told that anything promised is subject to change pending government orders. It will take some mills the whole of October to clean up third quarter orders.

Won't Unbalance Economy

There has been no big spurt in steel orders for defense. The defense program probably won't hit the industry in a tonnage way until the fourth quarter. There have been a few inquiries for specialties, shell steel and tubing for aircraft and tank treads. But these inquiries are not for tonnages sufficient to disturb the civilian economy—even if all were placed at once.

Some manufacturers are wondering how much of the high alloy stainless and chromium steels will be channeled into airplanes instead of autos and appliances. The modern jet fighter requires higher alloys in greater quantity than those needed during World War II. These highly specialized steels are difficult to make, and nickel and chromium, which they require, are in limited supply.

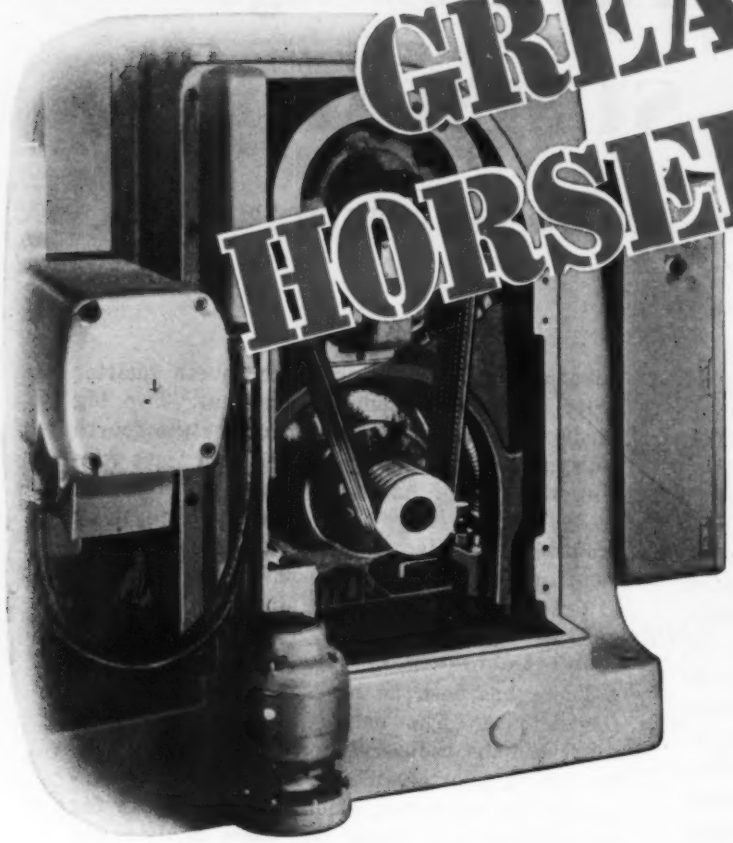
Scrap Prices Spurt

Consumers are thinking more about the possibility of getting government orders. They are evaluating their production setup and facilities, remembering the kind of work they did during the last war. Most of them will have to continue making their regular line until they get something specific from Washington.

The scrap market showed a new surge of strength this week. Prices spurted sharply in most centers and there was plenty of confusion as brokers scurried to cover old orders. Also lending steady strength to the market was the continued high rate of steelmaking. Operations this week are again scheduled at 101 pct of rated capacity.

(Nonferrous summary, p. 112)

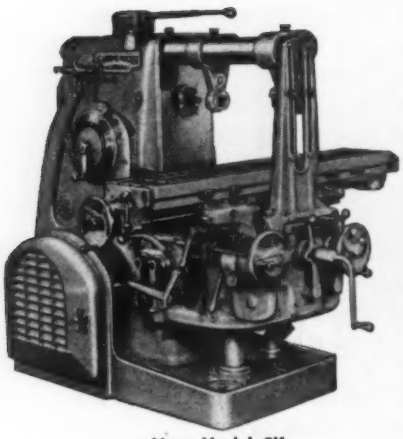
GREATER HORSEPOWER



The increasing use of carbide and cast alloy tools for milling ferrous and non-ferrous materials, has demanded Greater Horsepower to get fullest advantage of these tools. You'll find new CK milling machines meet this demand. Depending on machine size, (No. 2, 3, 4, 5, or 6) you get 10 to 25 hp independent motor drive for spindle plus separate 3 to 5 hp feed and rapid traverse drive. Motors are interlocked with positive automatic safety control for overload conditions. No danger of stalling cutters in cut.

A new line of knee-type milling machines

KEARNEY & TRECKER MILWAUKEE **CK's**



New Model CK
10 hp No. 2 Plain Style
Milling Machine

YES, Kearney & Trecker's new CK milling machines are packed with design and operating features that make them more productive, more profitable for you.

New CK columns give you greater rigidity. Compared to former columns, they give you 1000 pounds more metal in heavier ribbing, in box-type, sponson construction to absorb the heaviest cutting loads.

Spindle-mounted flywheel, broad feed and speed ranges plus Greater Horsepower give you the opportunity to obtain fullest possible benefit from modern cutting tools.

New design 2" diam. table feed screw affords greater bearing contact between screw and nut and is equipped with positive-acting backlash eliminator. Features that guarantee smoother feed for conventional and climb milling, longer screw life and greater accuracy.

For greater production, these machines are equipped with Kearney & Trecker's famous Mono-Level Control that shortens floor-to-floor time, and materially reduces operator fatigue. New, non-glare micrometer dials help avoid costly errors in reading . . . give you a positive lock at every setting.

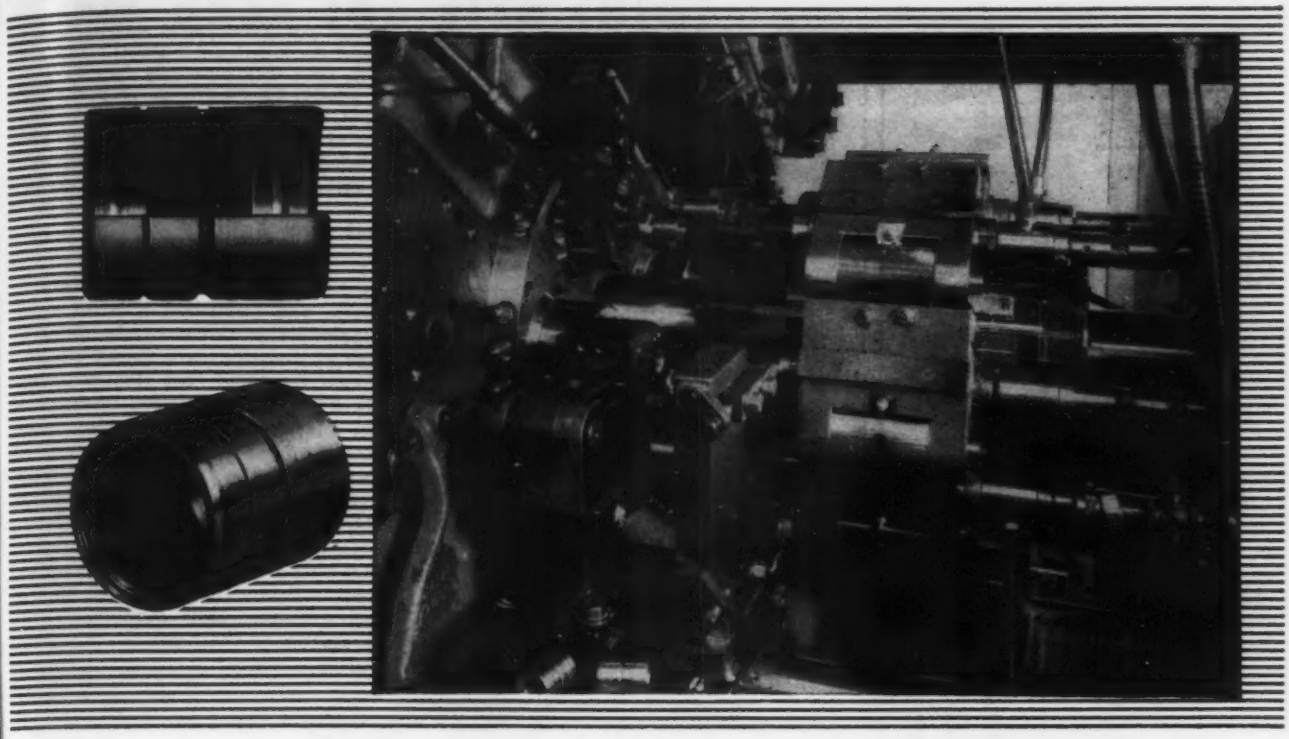
Automatic flood lubrication in column and knee and positive metered lubrication to table and saddle, plus generously proportioned gears and shafts assure you greater machine life.

Find out for yourself about Kearney & Trecker's new CK line of knee type milling machines . . . how they meet every demand of modern milling practice . . . how they can give you greater production at greater profit.

Sizes are No. 2, 3, 4, 5, and 6 . . . Plain and Universal styles. For complete details, contact your nearest representative or write direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

REPLACEMENT OF OBSOLETE MACHINE TOOLS IS AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS



HIGH Production—300 Parts Per Hr. and WIDE Tooling Adaptability Mean HANDSOME Savings in Machining Costs

"*More good pieces in the pan per day*"—that's what you get with an Acme-Gridley Automatic Bar Machine.

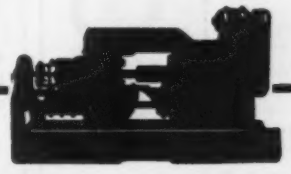
The reasons are inherent in the machine's basic design: positive, direct camming permits extremely accurate sustained production at high speeds. And broad, open tooling zones provide plenty of room for timesaving, money-saving independent-drive auxiliaries that combine cuts, reduce handling and machining times.

Typical of this versatility of tooling is the setup illustrated: four independently operated, internal recess-milling tools, two for roughing and two for finishing, are used, together with a shaving tool on the O.D.

Result? Very close concentricity, very satisfactory high production rate. May we show you how Acme-Gridleys can improve *your* production similarly?

JOB FACTS

Part—Bearing Cup
Material — SAE 52100 Steel Tubing
Operation — 10
Machine — 1¼" Acme-Gridley Bar Automatic
Machining Time — 12 Seconds Each (300/Hour)



Obsolescence is the creeping paralysis that strangles profit; the latest Acme-Gridley methods can breath new life into your production.

The NATIONAL ACME CO.

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SPECIFICATIONS

AMS 6260
AMS 6270
AMS 6272
AMS 6280
AN-S-14A
AMS 6324
AMS 6415
AN-QQ-756A
AMS 6320 (Hex)

ROUNDS—HEXAGONS
COLD DRAWN
HOT ROLLED

WE SEND A CERTIFIED ANALYSIS WITH EVERY AIRCRAFT SHIPMENT, AND THE RESULTS OF JOMINY HARDENABILITY TESTS WHERE NECESSARY.

OUR COMPLETE STOCK LIST OF AIRCRAFT, ALLOY & 1045 HR SENT UPON REQUEST.

HY-ALLOY STEELS CO.
30 N. LASALLE
CHICAGO 2, ILL.
RAN. 6-5253

Dear Editor

Letters from Readers

Consultant Wanted

Sir:

The article "Columbium—New Uses and Limited Supply" in THE IRON AGE issue of Apr. 27 interested me greatly. In brief—principals, for whom we are engaged in preparing and operating a rare metals refinery, will shortly have for sale considerable quantities of pure columbium and tantalum. Also in course of preparation are processes which will give a large volume of other rare metals such as beryllium, lithium, etc.

The metals will be in 100 pct pure form—either as oxides or as metal. Production initially should amount to approx. 100 lb of columbium and 50 to 75 lb of tantalum per day. Our ore reserves, of particularly high grade, are sufficient to maintain production at this rate for some 25 years.

Our problem now is to find potential users of the metals in the U.S.A. We have been in touch with General Services Administration in Washington, who have offered to buy all our concentrates, but no metal. As we are primarily interested in refining, we do not intend to sell concentrates.

We are, therefore, looking for someone who knows these metals who can assist us, either directly or on a consulting basis, to find markets for the products and to enlarge their uses.

T. B. RYAN
Vice Pres., Gen. Mgr.
Dominion Management Associates Ltd.
Montreal, Canada

Readers wishing to contact Mr. Ryan may address the above company at 680 Sherbrooke St. West, Montreal 2, P. Q., Canada.—Ed.

Small Ingot Hot Tops

Sir:

The July 13 issue Newsfront reports new metal hot tops for small ingots 6 x 6 in. and under. Can you please tell us where we can obtain further data, including if possible the patentee's or the manufacturer's name? We are also in urgent need of data on the Greenawalt process for sintering pulverized iron ores. Do you have the address of the manufacturer of this equipment?

Bureau of Metallurgical Research
Vancouver, Canada

The company using these hot tops prefers not to release any further information on them until development work has passed beyond the experimental stages. This may yet be some time, especially since the present clamor for steel is so great that all possible facilities must be devoted exclusively to production. The Greenawalt process is handled by John A. Greenawalt Co., 135 East 42nd St., New York, N. Y.—Ed.

Cast Iron Balls

Sir:

In the June 22 issue "Dear Editor" column, you published a letter from Mulheim-Ruhr, Germany, in which a series of questions are raised regarding cast iron and cast steel grinding balls. The Editor answers these questions for cast steel balls, but completely ignores cast iron balls.

In view of the current use of huge tonnages of chilled cast iron grinding balls, including alloyed balls of the Ni-Hard type, we feel that this answer is not only incomplete but misleading. Excerpts from our literature on Ni-Hard grinding balls include specific information on their use in the cement industry.

R. A. WHEELER
Mgr. of Publicity
International Nickel Co., Inc.
New York

Right. Ni-Hard balls are produced in two types: (1) Sand castings requiring the normal alloy content; and (2) Chilled castings requiring an alloy level of only 2.5 pct Ni and 1.25 pct Cr. to produce the martensitic structure. The chilled ball claims 20 to 40 pct greater abrasion resistance than the sand cast type.—Ed.

Newsfront Note

Sir:

We are quite interested in the item noted in Newsfront, July 13, regarding the painted steel garnish molding that the auto manufacturers are using on the inner doors with plated aluminum die castings. Could you give us any further information in regard to this new idea?

C. T. JORDAN
Sales Manager
Hardware Div., Charles Parker Co.
Meriden, Conn.

The plated aluminum die castings referred to are being used by Kaiser-Frazer Corp., Willow Run, Mich. This is a joint development by K-F and Doehler Die Casting Co. Further information may be obtained from either of these firms.—Ed.

Marshall Plan Changes

Sir:

In the June 22 issue you mention one of the new provisions of the Marshall Plan, being "the conversion guarantees to include such intangibles as patents, processes, techniques and cash investments." As we are very much interested in further details with regard to this, we are wondering if you would let us know what your source was for this information and, if possible, letting us know the exact number of the ECA release so that we could obtain a copy.

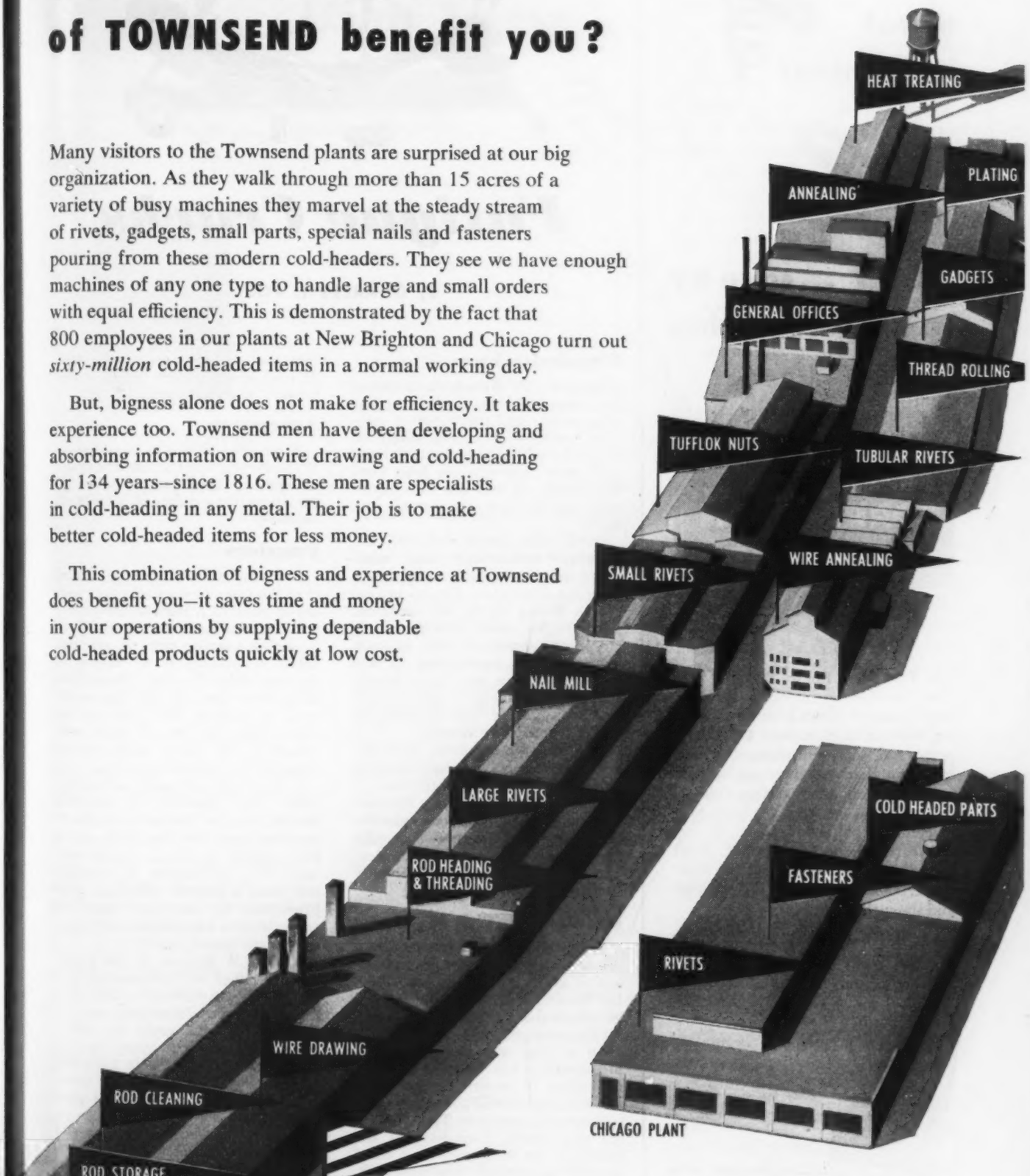
W. B. WESTON
Export Dept.
American Chemical Paint Co.
Ambler, Pa.

How does the size (BIG) and experience (LONG) of TOWNSEND benefit you?

Many visitors to the Townsend plants are surprised at our big organization. As they walk through more than 15 acres of a variety of busy machines they marvel at the steady stream of rivets, gadgets, small parts, special nails and fasteners pouring from these modern cold-headers. They see we have enough machines of any one type to handle large and small orders with equal efficiency. This is demonstrated by the fact that 800 employees in our plants at New Brighton and Chicago turn out *sixty-million* cold-headed items in a normal working day.

But, bigness alone does not make for efficiency. It takes experience too. Townsend men have been developing and absorbing information on wire drawing and cold-heading for 134 years—since 1816. These men are specialists in cold-heading in any metal. Their job is to make better cold-headed items for less money.

This combination of bigness and experience at Townsend does benefit you—it saves time and money in your operations by supplying dependable cold-headed products quickly at low cost.



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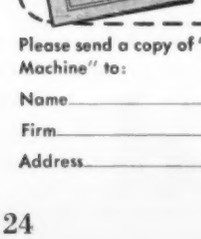

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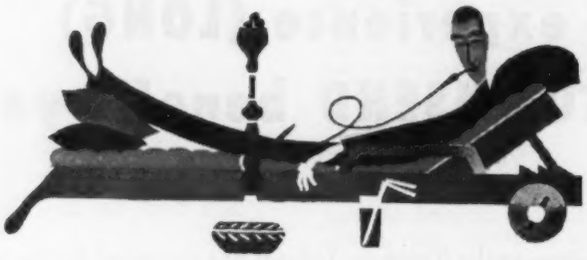


Fatigue Cracks

By CHARLES T. POST

Proximity Fuse

Demitri B. Shimkin's articles, last week and this, have the aroma of accuracy and the flavor of genuine research. The final stamp of authority will have to wait, though, until they penetrate the Iron Curtain itself. If you hear an explosion, you'll know they've hit the mark.

From what we've observed, the Russian technicians and engineers are considerably more frank than the economists. Day-to-day research shows up in the technical journals for which outside distribution is permitted. But as soon as you start speculating in the economic sphere, you hit a tender spot and are likely to hear a yowl for no apparent reason—particularly if you probe deeply.

Of all the recognition your favorite family journal has received, among the most significant was an article published by the Russian embassy in London some months back. We were denounced roundly for our appraisal of Russian steel production in the Annual Review issues.

Drink and Think

Industrial management has been deeply concerned with the problem of getting across to employees the financial facts of life as shown in corporate annual reports. Recently, some progressive firms have gone a long way in the use of pictographs, but even these pose difficulties in securing readership.

This year, ATF, Inc., parent company of American Type Founders and others, took note of the habits of its employees and came up with an entirely new approach. Distribution of its fiscal year income was indicated on a 3.5-in. diameter pie chart and the pie chart printed on coasters for beverage glasses. Thus the employee, as he sips his beer, can ponder the fact that salaries and wages took 34.7 pct of the income dollar, stockholders' dividends only 1.9 pct.

Aptronym

From the promotion standpoint, W. G. Power, head of the Chevrolet advertising department, bodes ill for competitive claims of other auto builders.

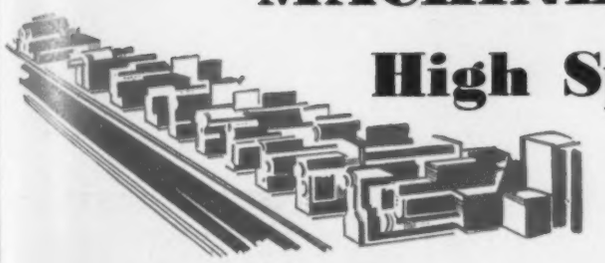
Puzzlers

It's only fair to let you know that the farm bloc among the readers of your f.f.j. resents the purely mathematical approach to problems involving grazing cows in circular fields. Complains W. G. Hayes of Hudson Motor Car Co., "Your June 29 problem does not say how much rope is used on the post, or the cow's neck, tail, etc. It omits reference to the elastic properties of rope or the ambition of the cow. . . . A rough estimate, which ignores the question of whether barbed wire is strung on the posts or close mesh net has been used, gives 12,000 sq ft. . . . I am certain that variations in rainfall will have a greater effect on milk production by your cow than the error in this calculation will have in the calculated yield."

And E. M. Hoover, of the President's Council of Economic Advisers, objects to our contention that the grazing area, were the cow tied outside the field, could be determined by merely subtracting the total area inside the field from the total area of the circle: "The cow's rope is going to get wrapped part way around the circular fence, so the curve marked out by the end of that rope is not a circular arc, or rather, only 180° of it is. . . . I still think it's a nasty problem and don't know the answer." He's right!

The base of last week's ladder is 7.07 ft from the wall, on the authority of H. C. Barnes, who submitted the problem.

MACHINE TOOL High Spots



Sales Inquiries and Production

By W. A. LLOYD

With the most productive end of the year ahead, it appears likely that shipments will top $26 million a month for the next 5 months and probably through next year.

Help Wanted — Manpower was the pearl of great price in the machine tool industry this week as plans for increased production, and in some cases, expansion of facilities, began to unfold.

Background for the manpower shortage can be found in the doldrums of 1949 when the industry was at its lowest point since pre-World War II days. The labor force was simply disappearing.

Demand Ahead — Present demand for machine tools has developed faster than manpower can be increased. By and large, the industry has good backlogs as the result of a steady increase in new firms for the 6 months preceding June, but monthly shipments have been increased only $2 million. May shipments were the highest since December, 1948.

Books Big Order—In Cleveland, Warner & Swasey Co. booked in July the biggest single month's peacetime volume in the history of the company, according to company spokesmen. Plans are to double present production by the first quarter of next year, and additional increases are planned for the second quarter. This will require doubling of present manpower, a spokesman reported. Women will be hired.

Eager to Start—In the East, at least one major machine tool company is trying to promote the idea of releasing 10 pct of the machines covered by the Tentative Production Schedules for immediate production, simply to get started. Also, an effort is being made to get releases on rebuilding work on some of the machinery now in the Government Reserve.

Machine Problem—Availability of some types of machine will be a problem for users for the next year. One producer of automatic screw machines is sold out until the middle of 1951. A builder of crankshaft equipment is sold out until January 1952 on certain units.

Putting on Weight — The subsidiary results of this have some sales managers wondering what the first move will be when salesmen have to again get out and sell. One sales manager, whose company is loaded with new business, had been congratulating himself on the good performance of his sales department when the recent upsurge occurred. "Now," he said, shaking his head sadly, "all these guys have to do is walk in and pick up an order. I don't know what I'll have to do to get the fat off them again."

War Speed-Up—Instructions to put any department on a 7-day week to meet production pressure for coming military orders was given to plant executives of the Timken Roller Bearing Co. by William E. Umstattd, president, at a special meeting this week.

He also countered imminent striving of Washington bureaucrats to nationalize large segments of industry under the guise of war controls. Specifically, Mr. Umstattd cautioned against Bill S3936 now being proposed by Senate committees and a similar House bill. He said that the measure will give President Truman dictatorial power over industry.

Requesting production officers to ensure that war orders get extreme preference, Mr. Umstattd stated that Timken had been on a 6-day week for the past several weeks to meet war demands. Production of rock bits and bearings for mining and the petroleum industry has been accelerated.

Firm Sold—Assets of the Ramsey Corp., a large piston ring producer, were taken over by Thompson Products, Inc., Aug. 1, and Frederick C. Crawford, Thompson president, was elected president of the newly-purchased subsidiary.

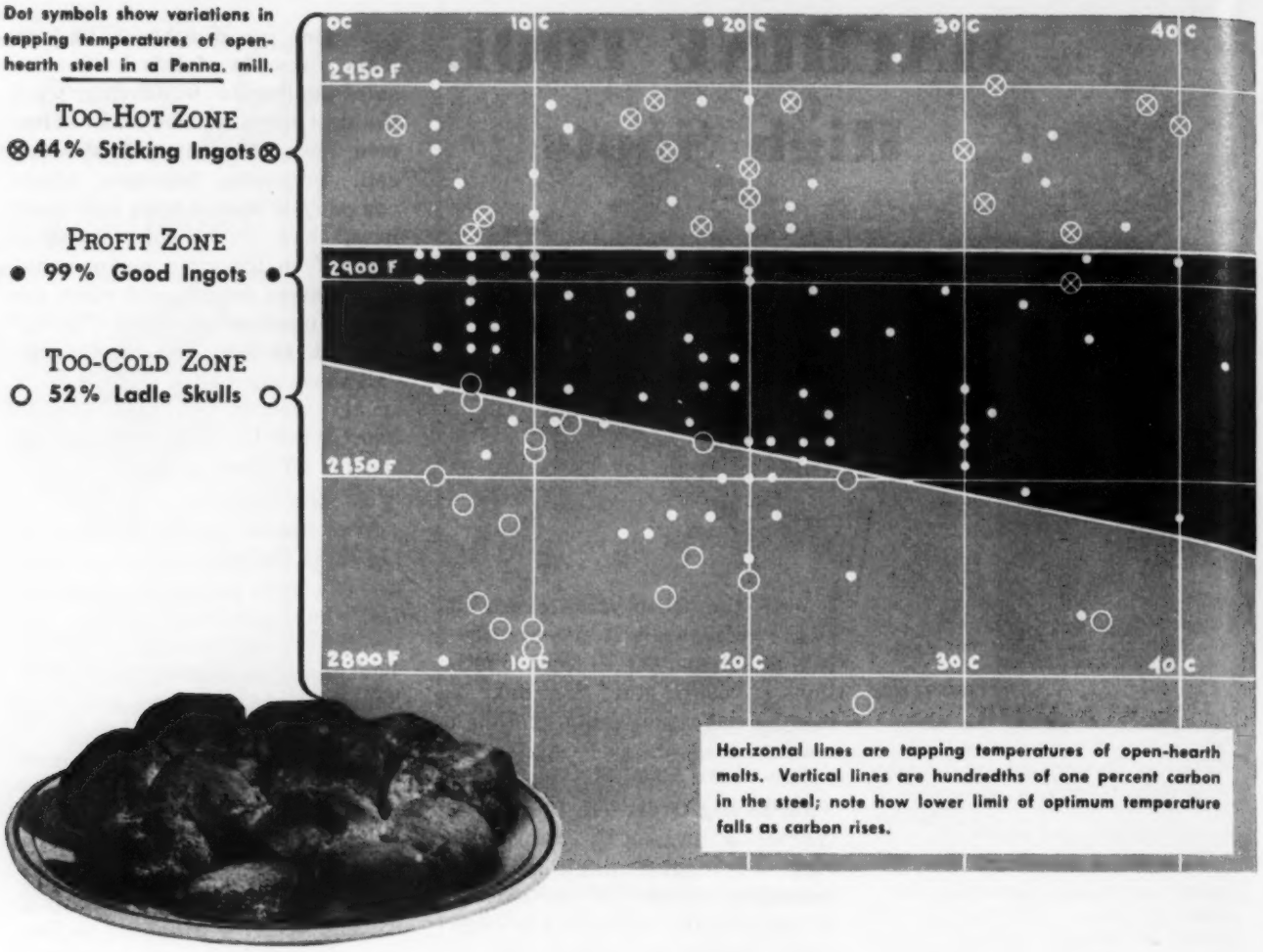
Other new officers are: J. A. Ramsey, vice-president and general manager; H. M. Ramel, vice-president, manufacturing; O. C. Holaday, vice-president, sales; M. W. Marion, vice-president, engineering; W. H. Chamberlain, secretary; E. E. Stuart, treasurer; and J. A. Fox, controller, all of whom are directors.

Dot symbols show variations in tapping temperatures of open-hearth steel in a Penna. mill.

TOO-HOT ZONE
⊗ 44% Sticking Ingots ⊗

PROFIT ZONE
● 99% Good Ingots ●

TOO-COLD ZONE
○ 52% Ladle Skulls ○



Horizontal lines are tapping temperatures of open-hearth melts. Vertical lines are hundredths of one percent carbon in the steel; note how lower limit of optimum temperature falls as carbon rises.

Fewer "Bride's Biscuits" from the Open Hearth

As every open-hearth man knows, molten steel is not unlike a bride's biscuit—it sticks to things. When tapped too hot, it sticks to ingot molds and stools; when too cold, some of the melt never gets to the mold, but sticks in the ladle as a cup-shaped "skull." But—these troubles with steel, like troubles with biscuits, yield to careful, persevering, intelligent methods.

In the case of steel, these methods now include measurements of steel temperature *before* it leaves the open-hearth furnace, in order to hit the correct tap temperature. And today's perfected model of the Immersion Rayotube is just the instrument for these measurements. Recent Rayotube improvements permit it to be plunged as often as desired right into the liquid steel, as a help in saving time, labor and fuel, while increasing the yield of each furnace melt.

Use Immersion Rayotube Often!

First helpers use the perfected Immersion Rayotube several times while working the heat. They check temperatures both before and after adding ore or oxygen . . . when adding alloy materials . . . when the bath is sluggish, as well as when it is finishing off satisfactorily . . . and always just before blocking or tapping. Using the instrument frequently makes it much easier to bring the melt to correct temperature just at the time all other metallurgical specifications have been fitted together to create the desired steel.

Maintenance Is Lowest

No other way of measuring bath temperature offers such a useful combination of dependable results and freedom from special maintenance after each reading . . . Why not let an L&N engineer supply the facts? Just write us at 4956 Stenton Ave., Philadelphia 44, Pa.

Acknowledgement is made to Clark and Feigenbaum of Jones & Laughlin Steel Co., in their AIMME Technical Paper 2031, for the above chart; but its use does not imply their endorsement of L&N products.

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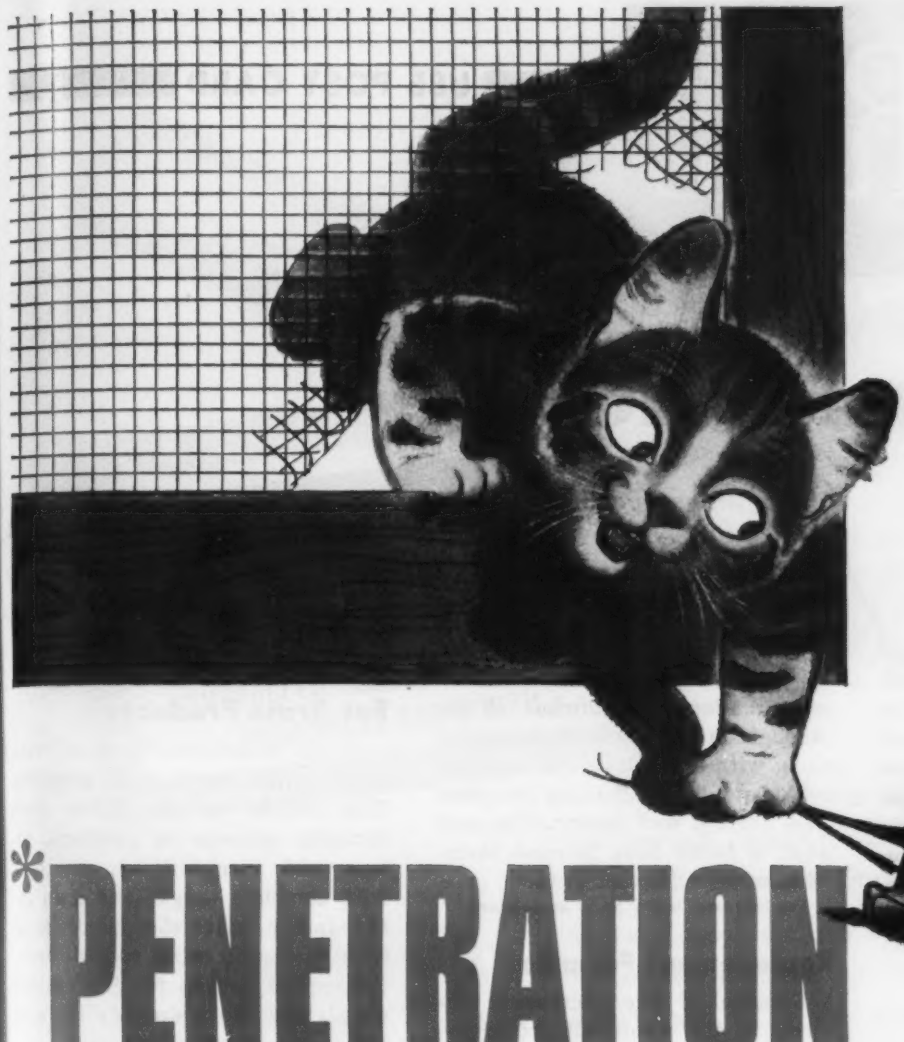

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Peak production . . . without worry of breakdown due to friction and wear . . . is made easier with Tycol high quality greases.

Made to "absorb punishment" without thinning down and dripping, Tycol greases avoid wasted lubricant, lost bearings and unnecessary down-time. These ultra-safe lubricants keep bearings . . . gears . . . shafts . . . friction-free and cool. They are available in grades with the proper "*PENETRATION" needed to give power a chance to produce with a minimum of waste.

Call your nearest Tide Water Associated office. Let them suggest the Tycol grease best suited to your needs . . . and remember, Tycol green cast greases are made from high quality cylinder stock and well refined neutral oil, with a minimum of soap — a maximum of oil . . . more efficient lubrication per pound of grease.

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Technical Services

With technology, engineering and research so prominent in present-day commerce, a new 6-p. brochure has been prepared emphasizing the necessity for these technical services. Illustrating jobs both in the laboratory and field, the brochure portrays the work of Sam Tour scientists, engineers, consultants and laboratories. It explains the scope of the services available from this independent organization and touches on such subjects as research, process development, product development and production methods. *Sam Tour & Co., Inc.*

For free copy insert No. 1 on postcard.

New Milling Machine

The new 10-hp No. 2 model CK plain and universal milling machines are described in a new 6-p. folder. General specifications and plan dimensions are presented, along with illustrations showing construction of component parts. *Kearney & Trecker Corp.*

For free copy insert No. 2 on postcard.

Curtain Wall Progress

Allegheny-Ludlum has just published a 24-p. booklet containing an interim progress report on the proposed methods of curtain wall construction in which prefabricated sections of stainless steel sheathing backed by insulating material would replace masonry or other materials in the construction of exterior walls of multi-story office and other buildings. Examples used in the booklet have been developed over a period of two years with the cooperation of numerous manufacturers, contractors and architects. A number of detailed scale drawings are presented along with a discussion of building codes and tests affecting stainless steel curtain wall construction and what is being done to meet them. *Allegheny-Ludlum Steel Corp.*

For free copy insert No. 3 on postcard.

Replacement Formula

Because of the increasing interest in the whole subject of replacement, a new 20-p. booklet was prepared covering the MAPI replacement formula and re-equipment timing studies. The booklet presents the text of the discussion given by E. M. Hicks, Asst. Mgr., Grinding Machine Div., at a recent meeting of NMTBA in Chicago. This study will prove valuable to interested companies in reviewing and developing improved equipment programs. *Norton Co.*

For free copy insert No. 4 on postcard.

High Temperature Shapes

The line of Leco recrystallized alumina, mullite, sillimanite, magnesia, fused magnesia, zirconia, fused alumina and thoria high temperature ceramic shapes is described in a new 12-p. catalog. Specifications and prices for a variety of crucibles, trays and dishes, combustion boats and tubes, thermocouple insulators and protection tubes are listed. *Laboratory Equipment Corp.*

For free copy insert No. 5 on postcard.

For Brass Products

A new pocket-size loose-leaf data book covers brass mill products. This handy, useable 138-p. book contains sections on products, alloys and compositions, together with complete weight and data tables in the major classifications of sheet and strip, wire, rod and tube. Conversion factors for the various metals and alloys simplify the contents. *American Brass Co.*

For free copy insert No. 6 on postcard.

Steel Selection Guide

All popular grades of hot rolled and cold finished carbon and alloy steel bars are listed in a new 4-p. bulletin giving principal characteristics, mechanical properties and uses. It is intended to serve as a quick, convenient and helpful guide to the selection of the most suitable as well as the most economical qualities of bar steel for the various jobs that come up in the average shop. Prepared especially for jobbing and repair shops and maintenance department, this guide also has proved useful to production men and designers. *Joseph T. Ryerson & Son, Inc.*

For free copy insert No. 7 on postcard.

Metal Rolling Doors

Kinnear all steel Rol-Top doors and actions, built to meet any size requirements, are shown in a new 12-p. catalog. These doors, which

Turn to Page 104

Select BARBER-COLMAN REAMERS FOR COST CONTROL and SIZE-FINISH CONTROL

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LOW-COST BLADE REPLACEMENT

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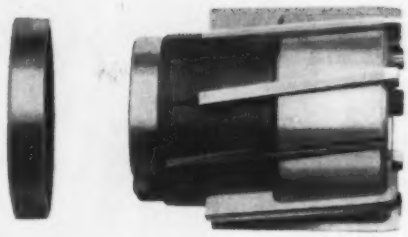

All Extra Parts Eliminated. Pins and Wedges Hold Blades Solidly Against Body, Comparable to Solid Flute Design.

If you choose between accurate, quality reamed holes — and low-cost reamer maintenance and operation — you can have both by using Barber-Colman Adjustable Reamers.

Barber-Colman pin and wedge design provides more blades per reamer diameter for better cutting action. Blades are solidly held in perfect diameter, avoiding any possibility for variation in roundness or straightness. Size adjustments are easily and quickly made, with size readily checked across any two blades.

These features mean better and faster results, with less cost per hole machined. Ask Barber-Colman reamer engineers to assist on your reaming jobs, or send tool and part prints for recommendations.

Free **PRODUCTION DATA**

Current Case Histories of Reaming Jobs Taken Directly From the Field. Get a Set Today. Ask For File 9932.

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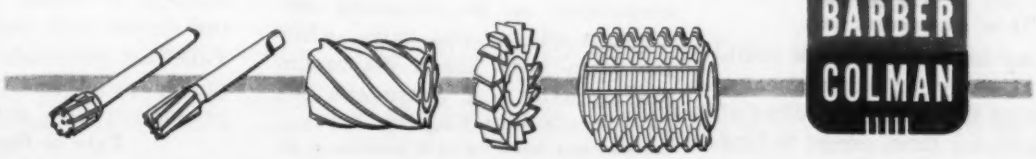
GENERAL OFFICES AND PLANT, 9932 LOOMIS ST., ROCKFORD, ILLINOIS, U. S. A.



BARBER COLMAN

NEW PRODUCTION IDEAS

Continued

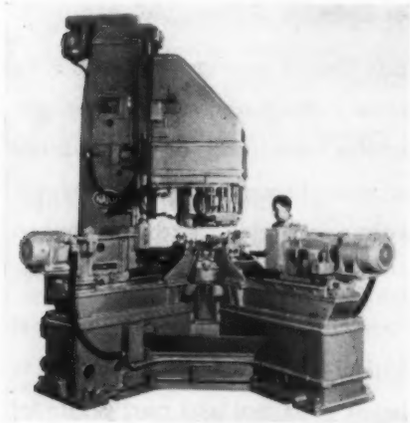
are supported by a saddle that moves on rails parallel to the axis of the tubing. Rails are elevated above the tubing, eliminating wear that occurred on former models, and the saddle rides the rails on four wheels. Wheel movement is controlled by means of gear racks. Simplified driving mechanism reduces number of working parts and insures smoother operation. *Tube Reducing Corp.*

For more data insert No. 21 on postcard, p. 35.

Drilling Machine

Machines and assembles 248 refrigerator pistons per hr.

A new four-way horizontal drilling machine comprises one vertical unit and head with standard column-wide ways; left front and rear horizontal units and drill



heads and a special unit for pressing in tubes, cutting off and inserting brazing wire. Machine operations include: Drilling; core drilling; facing; rough and finish reaming; chamfering; wire brushing; cutting off and inserting brazing wire; and assembling tube in piston. *National Automatic Tool Co.*

For more data insert No. 22 on postcard, p. 35.

Nut Driving Machine

Drives nuts of 5/16 in. min. to 11/16 in. max across flats.

The machine drives nuts semi-automatically or automatically, eliminating the manual handling of the nuts at any time, except to load the rotary barrel hopper periodically with a fresh supply of nuts. The hopper keeps the machine continually charged with nuts and

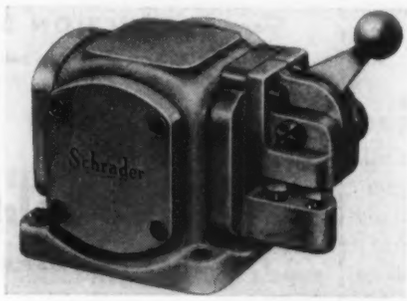
feeds them in a pre-positioned manner to the driving spindle. The operator has only to handle the parts to be assembled by placing the assembly in the locating fixture mounted on the work table of the machine. The machine is said to be equally efficient for special nuts, such as jam, castellated, lock, etc. *Detroit Power Screwdriver Co.*

For more data insert No. 23 on postcard, p. 35.

Air Control Valves

For air passage of 250 cu ft per min at 100 lb line pressure.

The new four-way valve is ½ in. size, specially designed for base mounting with manifold pipe ports



for concealment of piping. It incorporates, as an actuating medium, a sliding seal valve, while the main body has a diaphragm sealing action. *A. Schrader's Son Div. Scovill Mfg. Co., Inc.*

For more data insert No. 24 on postcard, p. 35.

Electrode Dresser

Restores electrodes to original shape without removal from welder.

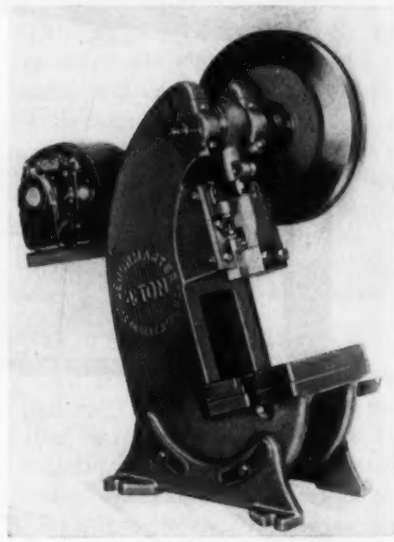
A fast, easy-to-use tool for redressing round electrodes of single or multiple-point welding machines, combines the functions of both angle and thin-type dressers. The cutter attachment of ¾ in. thickness readily accommodates close-clearance jobs. Fast cutting action is provided by a free speed of 1750 rpm. *Keller Tool Co.*

For more data insert No. 25 on postcard, p. 35.

Four-ton Punch Press

Eight-in. open height provides large vertical working dimension.

Increased tooling height added to the 4-ton standard punch press is valuable for adapting special tooling, for easing setups, and for permitting use of dies and die sets heretofore too large for the standard 4-ton Benchmaster. Other improvements are: new heavy-duty clutch dog made of special shock-



resisting steel; clutch linkage doubled in thickness for greater strength and rigidity; and clutch wedge redesigned to incorporate a special safety-stop solid block. *Benchmaster Mfg. Co.*

For more data insert No. 26 on postcard, p. 35.

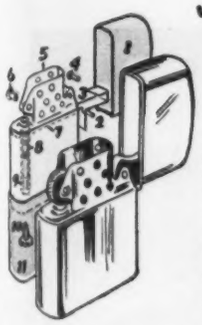
Guided Pallets

Handle mixed goods requiring varied processing periods.

Power units and gravity sections that bolt together allow plant workers to install and rearrange the system to fit production needs. Palletized materials remain on the guided pallet line throughout the production cycle, with flow to each

Turn to Page 106

Metals at work



"No Zippo owner ever spent a cent for repairs"

That is the unqualified, unconditional guarantee held by millions of Zippo Lighter owners. How does Zippo do it? First, the design is excellent. Second, meticulous care is employed in manufacturing. And third, the right metals are used in the right places . . . metals that are easy to fabricate, economical to finish and that do their assigned jobs for years on end. You guessed it. Eleven components of the Zippo Lighter are made of Anaconda Brass and Nickel Silver Alloys in the form of strip, wire, rods and tubes.

We take our own medicine

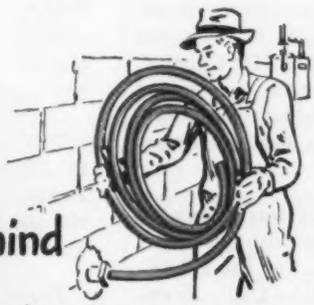
And it's good! For years we've been extolling the merits of welding with Bronze. Then our subsidiary, the American Metal Hose Branch ran into a toughie—braze-welding the fittings on these 2½" diameter Vibration Eliminators for refrigeration lines. The assembly includes a thin-wall flexible bronze tube, a rigid copper tube fitting, a copper ferrule, and—672 strands of .028" bronze wire. Result: a strong, ductile, vibration-resistant weld, absolutely leakproof against the most searching refrigerants. Want a booklet on Anaconda Bronze Welding Rods? Ask for Publication B-13.

Stuffed with Copper

Ever since The American Brass Company developed a means of producing electrolytically deposited copper in practically unlimited lengths, new uses for this paper-thin metal pop up continuously. Most recent is the application of "Electro-Sheet" in Multi-Velocity Air Filters, made by Research Products Corp., Madison, Wis. The copper, slit and expanded, has important advantages over other materials: Light weight, high dirt-holding capacity, non-clogging and improved cleanability features; and lower restriction at all air velocities up to 550 feet per minute. Just in case you want to know, "Electro-Sheet" is available in thicknesses from .00068" to .0094", in widths up to 62".

Look this way, please

Designed to sell at $14.95, the Beacon "225" Camera, produced by Whitehouse Products, Inc. of Brooklyn, N. Y., introduces a degree of precision befitting much more costly cameras. Handsomely styled, the Beacon "225" uses standard film and is inexpensive to operate. This policy of offering high-quality at low-cost has met with marked success, for more than 300,000 Beacon Cameras have been sold to date. Dozens of the intricately formed camera parts, made of copper base alloys, were produced by our Waterbury Brass Goods Branch—in large quantities, inexpensively, to unusually close tolerances in multiple die production. If you're interested in this type of work your sample, sketch or description will start the ball rolling. 9099



Out of sight but not out of mind

Maybe you never gave a thought to those gas service lines that run from the main into the house. But you can bet your gas company does, for replacing rusted out steel services is a major item of maintenance expense. So . . . twelve years ago a large midwest utility started replacing gas service lines with copper tube—very often eliminating trenching by pulling the smaller 1" or 1¼" tube through the reamed-out steel pipeline. 25,000 replacements have been made by this one company alone, and—surprise—the total cost of a rust-free copper renewal is considerably less than that of a steel replacement!

ANACONDA

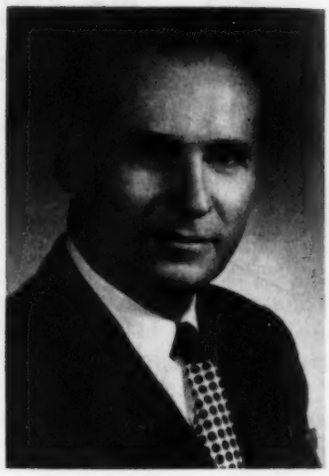
the name to remember in

COPPER, BRASS & BRONZE

Iron Age *Introduces*

LAWRENCE F. BLACK, named general superintendent of Geneva Plant, Geneva Steel Co., U. S. Steel Corp. subsidiary.

JACK R. HIGHT, former IRON AGE promotion manager, appointed manager of public relations and advertising, Sharon Steel Corp.



DONALD J. HENRY, who becomes assistant head of the metallurgy department, General Motors Research Laboratories.

Newly named members of the board of directors of E. F. HOUGHTON & CO., Philadelphia, are **D. C. Miner** and **William K. Barclay, Jr.**

Paul C. Sandmeyer has been appointed vice-president of the STAINLESS STEEL SALES CORP., Philadelphia.

Fred M. Gillies was appointed a director of WHITING CORP. to fill the vacancy caused by the recent death of **Gen. Thomas S. Hammond.** Mr. Gillies was elected to the post of executive vice-president of ACME STEEL CO. in May.

Elbridge G. Dudley and **Louis F. Rodewig** have been appointed manager and assistant manager, respectively, of the industrial division of the GENERAL ELECTRIC apparatus department's New York district.

Clayton E. Scholes was named sales sales manager of the Edgar T. Ward Cleveland Div. of SOLAR STEEL CORP.

A. W. Sawyer was appointed assistant to the vice-president of the LINCOLN ELECTRIC CO., Cleveland. He had previously been employed by BELL AIRCRAFT, Buffalo.

William F. McConnor has been elected executive vice-president of the NATIONAL TUBE CO., subsidiary of U. S. STEEL CORP. At the same time, **H. J. Wallace** was elected vice-president in charge of sales.

Jack P. Pederson has been named general manager of the Warner Div., CLINTON MACHINE CO., Clinton, Mich. Mr. Pederson was formerly associated with the Scintilla Magneto Div. of BENDIX AVIATION CORP. **Col. Oliver K. Gardner** has been named assistant to the president and **Clarence A. Sherman** has been appointed chief engineer.

Kenneth A. Stroble was appointed general sales manager with headquarters at Braeburn, Pa., for the BRAEBURN ALLOY STEEL CORP. **Frank T. Klock** replaces Mr. Stroble as western New England sales manager.

Joy E. Beanblossom has been made manager of development for HOOKER ELECTRO-CHEMICAL CO., Niagara Falls, N. Y. **James S. Sconce** was named manager of research and **Dr. Bruno H. Wojcik,** assistant to the technical superintendent. In the sales development department, **James S. Walker** has been appointed as supervisor of technical sales service.

Francis Thomas has been elected a vice-president of ORINOCO MINING CO., New York. Mr. Thomas has resigned as a vice-president of S. J. GROVES & SONS, contractors and engineers of Minneapolis, to accept the new appointment.

Hamilton Merrill, a vice-president and director of MANNING, MAXWELL & MOORE, INC., has been elected president of the company. Mr. Merrill succeeds **Robert Ross Wason,** who died recently.

Five new directors recently named by FORD MOTOR CO. are: **John S. Bugas, L. D. Crusoe, D. S. Harder, Harold T. Youngren** and **Theodore O. Yntema.**

Frank W. Leitner, formerly an engineer with the GRANITEVILLE CO., has been appointed a sales engineer for the RELIANCE ELECTRIC & ENGINEERING CO. Mr. Leitner will headquarter in the Reliance office at Charlotte, N. C.

Eugene N. Lohre, formerly assistant to the vice-president in charge of sales, has been named district manager of the Chicago territory sales office by JESSOP STEEL CO., Washington, Pa.

J. Paul Ahlbrandt was recently named to the post of manager of product development by the CLARK GRAVE VAULT CO., Columbus, Ohio. Mr. Ohlbrandt was previously director of manufacturing for the HAMILTON MFG. CO.

T. S. Bonnema, vice-president in charge of production, has been elected a director of OSTER MFG. CO. He has served in various capacities since starting with the company 28 years ago.

C. E. Houston becomes manager of the recently opened retail store for HYSTER industrial trucks in Peoria.

Robert Richmond has been appointed assistant purchasing agent of the U. S. STONEWARE CO. and its affiliates.

Olo E. Brown, Jr., research metallurgist, was recently added to the staff of the West Coast Research and Development Laboratory of ROBERT-SHAW-FULTON CONTROLS CO., Los Angeles.

William E. Thompson, associate research mechanical engineer at the CORNELL AERONAUTICAL LABORATORY, INC., Buffalo, has been appointed instructor in mechanical engineering at Illinois Institute of Technology.

Clyde R. Paton takes over as director of engineering for WILLYS-OVERLAND MOTORS, INC.

A. A. Englehardt, who has been in the sales organization of the ECLIPSE FUEL ENGINEERING CO., Rockford, Ill., for 14 years, has been appointed district sales representative at Chicago.

HOMER E. RIEKER, who takes over as manager of Tubular Products Dept., Joseph T. Ryerson & Son, Inc.

Iron Age Salutes

DONALD B. McLOUTH

DON McLOUTH, at 48, is probably Detroit's No. 1 salesman and is undoubtedly on closer personal terms with Detroit's leading industrialists than any other salesman in the area, a fact that has served him well in building his business from a small steel warehouse to a two-plant operation in a little less than 20 years.

Unaffected and an easy talker, he constantly displayed a quiet but persistent ambition to build a bigger and better steel operation in Detroit. To many he is a composite steel and automotive man. While respecting steel traditions, he has no hesitation in moving into uncharted fields.

The men he originally attracted to him nearly 20 years ago have stayed with him, a tribute to the fact that he wears unusually well. While his steel operations have made amazing progress, Mr. McLouth is not regarded by his intimates as a hard driver. Respect for his quiet ambition was best evidenced by one of his executives who was heard to say, "Every time Don McLouth passes a vacant lot I get scared. I'm afraid he'll want to stop and buy it."

Don McLouth began at 21, operating a small steel brokerage business. This developed and in 1934 he organized the McLouth Steel Corp. which made its first hot-rolled steel strip late in 1935. In 1938 the company started cold-rolling. And it kept right on growing.

Mr. McLouth is active in many civic and public enterprises. He is president of the board of trustees of the Oakwood Hospital Commission, and has been chairman of a seven-man Conservation Commission for Michigan during the past 2 years.

In addition to his many-sided industrial activities, he owns and operates an outdoor club near Gaylord, Mich., where 500 to 600 ski enthusiasts gather on winter weekends. During the summer it is operated as an exclusive resort.

Forward looking Donald B. McLouth adds a dramatic chapter not only to the production of steel but to the opportunities which are offered in this country by free enterprise and plain hard work. His is a modern day success story of the "bootstraps" variety — living proof that there is no ceiling for a young man with courage and ability.

EUGENE B. BROWNELL, who becomes president and general manager, Kurz & Root Co., Appleton, Wis.

Promotions and additions announced by MINNEAPOLIS - HONEYWELL REGULATOR CO., include: Charles F. Woods, valve division sales manager for southwest region; **Edward J. Byrne,** industrial manager Dallas branch; **Howard W. Griesbach,** industrial manager Milwaukee branch. Additions to the field sales staff are: **Louis C. Schultz, William E. Van Horne, William J. Kirby** and **P. R. Vogel.**

H. J. Hunkele, Jr., was named assistant manager of sales engineering division, CATERPILLAR TRACTOR CO.

J. Nall Candler was made administrative assistant to **F. M. Hawley,** president and general manager of MORSE CHAIN CO., a division of BORG-WARNER CORP. Mr. Candler was formerly assistant general manager of the Norge Div. of BORG-WARNER.

Chester H. Butterfield, vice-president of MANNING, MAXWELL & MOORE, INC., has been named vice-president in charge of the Consolidated - Ashcroft - Hancock Div. Mr. Butterfield succeeds **Hamilton Merrill,** who was recently elected president of the company.

Francis I. Taylor, Jr., has become a New England representative in the industrial castings sales division of HUNT - SPILLER MFG. CORP., Boston.

Robert N. Black was appointed supply manager of BORG-WARNER INTERNATIONAL CORP. Mr. Black recently returned from a six months' business tour of all South American countries. He joined the company in April, 1947.

Iron Age Introduces

Continued from Page 51

Arthur D. Whitmer has been named manager of STUDEBAKER'S new passenger car assembly plant to be constructed in North Brunswick Township, N. J. **Lloyd E. Ransom,** general foreman of the truck plant since 1948, succeeds Mr. Whitmer as superintendent of the Chippewa plant.

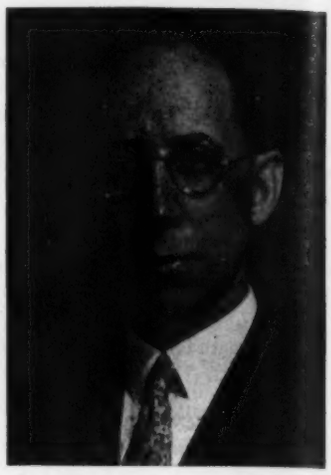
Andrew Liston was appointed manager, hydraulic turbine and marine products department, BALDWIN LOCOMOTIVE WORKS.

A. J. Grindle of WHITING CORP., Harvey, Ill., has been appointed consulting metallurgical engineer to succeed the late **A. W. Gregg.**

Carl Voorhies becomes chief engineer of the Valve Tappet Div., CHICAGO SCREW CO., Bellwood, Ill.

Jesse W. Eakins was appointed eastern Michigan and Toledo area sales reprentative for CENTRIC CLUTCH CO., Cranford, N. J.

R. C. Kinley, vice-president and works manager of the NATIONAL ACME CO., Cleveland, announced his retirement from active duty after 47 years of service. He will continue to serve in a consulting capacity. **Beaman H. Ayers** succeeds Mr. Kinley. **John L. Molner** takes over Mr. Ayers' former post of general superintendent.



W. H. WINANS, elected vice-president of industrial relations, Union Carbide & Carbon Corp.

John L. Hamilton becomes general sales manager for the FENTRON STEEL WORKS, Seattle.

Manuel Shaftel was named to represent the J. C. WHITLAM MFG. CO. in Brooklyn and Long Island, while **Jack Kasrel** will cover Chicago, northern Illinois and the Calumet area in Indiana for the company.

Grant A. Colton was recently elected vice-president and general manager of GOLDEN - ANDERSON VALVE SPECIALTY CO., Pittsburgh. Mr. Colton has served as assistant manager of the company since 1943.

James F. Stomber has been appointed administrative assistant for the Hanson-Van Winkle-Munning Co.

OBITUARIES

Jones C. Fuller, 64, accountant for American Steel & Wire Co., in Birmingham, died recently after a long illness.

W. B. Pickard, a vice-president of American Brass Co., died July 22 at Waterbury, Conn.

John A. Johnston, 78, originator of the clover-leaf design for highway intersections and former president of the Worcester Engineering Society, died July 24 at Worcester.

Andrew Czapak, 36, chief engineer of the Volco Brass & Copper Co., Kenilworth, N. J., passed away recently at his home in Elizabeth, N. J.

Edward S. Atkins, 52, secretary-treasurer of the Los Angeles Steel Corp., Los Angeles, died early this month.

Arthur H. Timmerman, a vice-president of the Wagner Electric Corp., died in Dallas on July 18 at the age of 79.

Clyde E. Cochran, 44, an engineer with the Elwell-Parker Electric Co., Cleveland, passed away recently at Twinsburg, Ohio, where he was born 72 years ago.

Edward Leo Gann, 58, died recently. He had been associated with the Hanson-Van Winkle-Munning Co., Matawan, N. J.

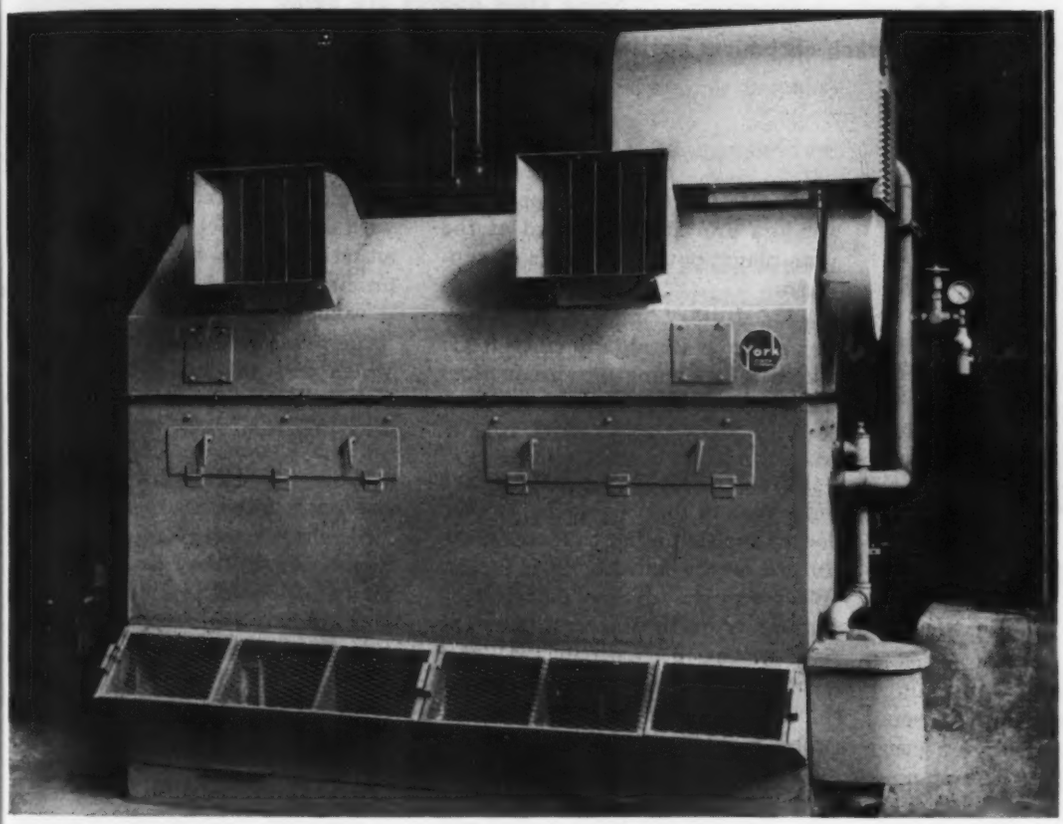
Louis T. Shorley, president and treasurer of Freyn Engineering Co., passed away on July 20 in Chicago.

Herbert Charles Jarvis, 68, retired chief mechanical engineer for the Pacific Car & Foundry Co., died recently in Seattle.

TO OWNERS OF AIR CONDITIONING AND REFRIGERATION EQUIPMENT...

Worried Over Water

The York Water Economizer, equipped with Revere Copper and Brass Fittings to guard against corrosion and assure trouble-free operation, will save you up to 95% on water.



FOR many years Revere has furnished the York Corporation, York, Pa., with copper and brass for use in its air conditioning, refrigeration and heating equipment. Engineers at York tell us that during that time they have learned to depend on Revere Products for high quality and uniformity of metal, correct temper, and strict adherence to specifications.

It was this satisfaction with Revere over the years that led York engineers to specify Revere Products for the York Water Economizer. The brass spray nozzles and copper water and refrigeration tube with which this unit is equipped assure constant, trouble-free protection against that efficiency-destroyer which is ever-present when water and metals get together . . . corrosion.

This is a mighty important thing for York, and a mighty important thing for present and prospective owners of air conditioning and refrigeration equipment. The York Economizer itself is a mighty important unit right now, too. For, with water a most critical item in many sections of the country, both from the standpoint of supply and disposal facilities, the York Water Economizer makes it possible to save up to 95% of the amount of water normally required. On a typical installation of 100 tons of refrigeration capacity, for example, 17,100 gals. of water can be saved every hour of operation!

York also uses Revere Copper and Brass products in its water coolers, for cooling coils, chilled water piping, and other component parts of its air conditioning systems.

Perhaps there is a Revere Metal or alloy that you can use to advantage in your product. Why not call the nearest Revere Sales Office and see?

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Auto output should stay high through September . . . Final quarter outlook uncertain . . . Some steel quotas are being cut . . . Nickel, chromium bottlenecks seen pending.

By WALTER G. PATTON

Strong in the Storm—Assuming there is no direct interference from Washington, the outlook for continued high production of automobiles during August and September is good, despite the Korean storm warnings. This is not to say that world events could not overturn the rosy Detroit outlook very quickly.

However, assuming steel, aluminum, nickel are available for present needs the outlook is for continued high production at the present rate of 170,800 to 185,000 units per week. Most August projections are in the range of 800,000 to 845,000 vehicles.

Reasons for Strength — There are several reasons why production is likely to continue during August and probably September at near the present rate.

(1) Most of the steel required for August schedules is currently available. September steel is in sight.

(2) Most parts to be supplied by vendors are either on hand at the auto plants or in the plants of suppliers.

(3) Military items, even where plans are finalized, will have to be tooled before going into production. This will require several months at least.

Crystal Ball Notes—Here are some factors that should not be over looked in attempting to forecast the future of the automobile industry. With respect to new models, the timing is quite different than the 1941 situation. Late in 1941 just after they had *completed* their 1942 tooling, automobile manufacturers were requested to suspend model changes to the needs of the airplane program. On the other hand, the timing of the 1950 crisis comes when some producers have completed their 1951 tooling and other programs are 80 pct to 90 pct complete.

Also, it is reported that some car producers have practically exhausted their banks of 1950 model parts. In this situation, they have two choices: (1) Make further releases against 1950 model runs and (2) go ahead with their plans as scheduled for 1951 models.

Postponement Favored — Both courses are being followed in the automobile industry today. No one can say for certain which way the cat will jump. It seems logical to suppose, however, that most of the odds favor postponement of a model change rather than going forward with a new model. The logic of the situation seems to be that if car production *should* be discontinued it would be better to start up with a new model rather than a car which just got into production before being side-tracked for a military program.

Worrying Less—For the most part, car builders are not as worried about steel for August and September as they are about the final quarter. Several firms have reported their allocations have been cut. In some cases a specific reason is given for the reduction. Acceptance of a large shell contract by one steel producer has accounted for the reduction in the allocation of one auto firm.

However, the number of curtailments so far is surprisingly small in view of the serious international situation. Every auto executive has his fingers crossed, hoping the situation will not become tragically worse due to national hysteria, mismanagement in Washington or any of the other factors that help create critical materials shortages.

Key to Production—Nickel and chromium seem to hold the key to automobile production in the final quarter. With nickel on allocation, the supply is already uncomfortably tight. The use of nickel anodes and nickel salts for plating by the motor car industry is tremendous.

Some firms which have examined their chromium requirements very

carefully find that the consumption of chromium exceeds even that of nickel. Before the present trouble with Russia developed, a large share of the U. S. chromium supply came from that country. With aircraft quality steels expected to take an increasing share of nickel and chromium, the outlook for these materials in the final quarter is dark at the moment.

Eyes on Aluminum — Another material that will have to be watched is aluminum. This light metal is not generally regarded as a big factor in automobile production since it is not used for body sheets. However, in the aggregate, the tonnage of aluminum specified for automobiles is surprisingly large.

Here is a partial list of applications for aluminum: Transmission case covers, cylinder heads, taillight housings, torque converter parts, concealed running boards and, probably most important of all, aluminum pistons. With aircraft production plans moving ahead rapidly, the aluminum outlook can hardly be called promising.

Phenomenal Popularity — The "Hardtop" has turned out to be one of the biggest auto styling surprises in the postwar era. Originally conceived as the swank design primarily for the so-called carriage trade, "Hardtop" production is soaring. Ivan I. Wiles, general manager of Buick, has just revealed that this body style accounted for 92 pct of all Roadmaster production in June.

In the Buick Super series, the new Riviera coupe and Riviera sedan accounted for 74 pct of Buick production. Out of combined output of 32,709 in the Roadmaster and Super series built in June, 25,707 were Riviera styled. Since last January Buick has built more than 118,000 "Hardtop" models to lead all the other producers in the industry.

What's the Reason?—There is no immediate explanation for the rejection of the Hudson contract by the membership of Local 154, UAW-CIO. The proposed agreement was scuttled in a meeting attended by only about 5 pct of the local membership.

There are several possible explanations, none of which can be substantiated at the moment. The rejection has been attributed to (1) a recalcitrant local, (2) a planned maneuver to boost wages in the face of a threat of a government freeze. The argument runs like this: As long as the cost-of-living remained the same pensions were okay. Now union leaders are demanding more money to bolster their members' wavering purchasing power.

The union rejection may not represent a change in policy of the UAW-CIO but with the cost-of-living rising steadily its pension drive is undoubtedly losing some of its steam. It is important to note that the Hudson agreement did not include the GM cost-of-living wage formula.

Foreign Styling Trend — Late this month Packard will introduce its 1951 line of passenger cars. Those who have seen the cars believe they will earn high public acceptance. The cars will be entirely new and the styling is modern in every respect. Hugh J. Ferry, president of Packard, has disclosed that more than 90 pct of its new cars will be equipped with Hydramatic drive. Packard officials have described the 1951 models as having a European styling trend which should win strong appeal in this country.

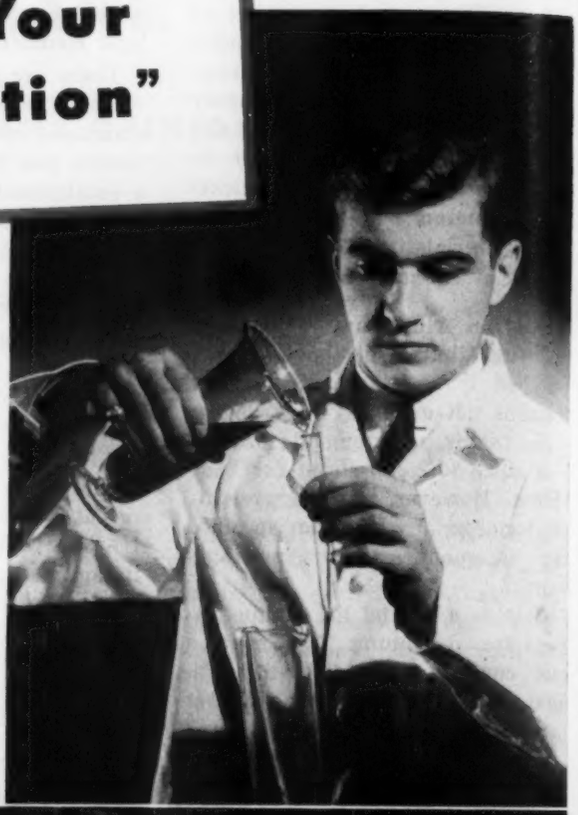
First Round Over—Ford and the UAW-CIO have settled a seniority dispute involving the transfer of workers from the Rouge and Highland Park plants to the new Ford and Lincoln parts depots in the Detroit area. The new parts depots now under construction on Middle Belt and Telegraph will employ an estimated 1900 workers.

Union spokesmen see this dispute as only the first round of an overall dispute involving what they refer to as Ford's "runaway plants." The union is planning a membership meeting to review Ford's proposed decentralization program, according to union sources.

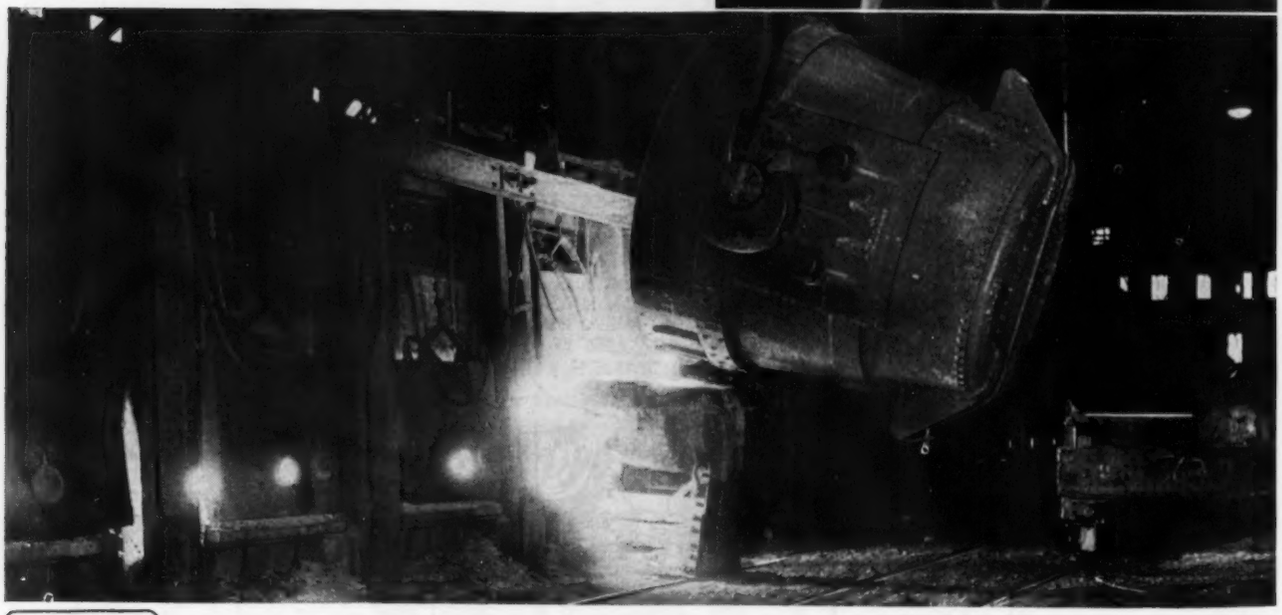
THE BULL OF THE WOODS — By J. R. Williams

FROM FRISCO IT'S ONLY A HOP OVER TO HAWAII AND THEN ONLY A STEP TO HONG KONG AN' AUSTRALIA, NAGASAKI, AN' ALL THEM PLACES WHERE OUR BIG CRANES ARE!
TH' BULL'S BEEN SO GRUMPY OF LATE IT LOOKS LIKE EVERYBODY IS TRYIN' TO GIT HIM TO TAKE A TRIP AROUND TH' WOILD!
WELL, IT DOES LOOK EASY ON A MAP, BUT THAT'S TOO BIG A MAP! GOIN' OVER IT IS A LONG TRIP FOR HIM!
T. M. REG. U. S. PAT. OFF.
COPR. 1950 BY NEA SERVICE, INC.
THE TRAVEL AIDS
8-11
J.R.WILLIAMS

Steels Made to Your "Product Prescription"



Just as an expert pharmacist mixes prescriptions with precision, Wisconsin steelmen produce "H" steels with guaranteed hardenability bands. Wisconsin "H" steels can be heat treated to meet a broad range of hardenability requirements. They're made to your specific "product prescription." Contact our sales and metallurgical staffs for additional information.



INTERNATIONAL HARVESTER

WISCONSIN STEEL COMPANY, Affiliate of INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue • Chicago 1, Illinois

WISCONSIN STEEL

WEST COAST PROGRESS REPORT

Digest of Far West Industrial Activity—By R. T. REINHARDT

Still Lagging — Although steel production has increased tremendously in the seven western states since 1940 (The Iron Age, July 27, 1950, p. 51), analysis shows that this area is today more dependent upon eastern and other sources of steel than in the prewar period.

Percentage-wise, the seven western states produce more of the steel consumed in this territory than in 1940 when total consumption was approximately 2½ million tons of rolled products and production was approximately 900,000 tons. Last year consumption in the seven western states was approximately 4,300,000 tons and rolled product production was approximately 2,400,000 tons or 56 pct.

Shipping Grows—These figures indicate that today shipping into this area is approximately 1,900,000 tons per year as against a total of 1,600,000 tons in 1940.

In the event of an all-out war the strain on shipping facilities to bring this tonnage West would be an important factor. It is estimated that last year approximately 600,000 to 700,000 tons came in by water from eastern ports and the remainder was shipped here by rail.

Tinplate Buying — Principal shipments are in the specialty class such as tinplate. It is estimated that currently the West is buying about two-thirds of the total tinplate requirements of the Coast which are now said to be about 700,000 tons per year. Other flat rolled products such as galvanized, cold and hot-rolled sheet are in short production in the West where it is estimated that only about one-half of the tonnage of these products consumed is made here.

Total consumption of such products is estimated at about 500,000 tons. Other products not made in sufficient quantities locally to satisfy demand include oil company goods, railroad products, wide flange beams, stainless steels and many alloys.

Still Trying — Steel producers, well aware of these production deficiencies, are planning and pushing expansions. There is increasing evidence that U. S. Steel is considering expansion of ingot capacity at Geneva, Utah, to the extent of two additional openhearths and there is also a possibility of new rolling facilities being added to broaden the line of products produced there. No confirmation or denial comes from the U. S. Steel Corp.

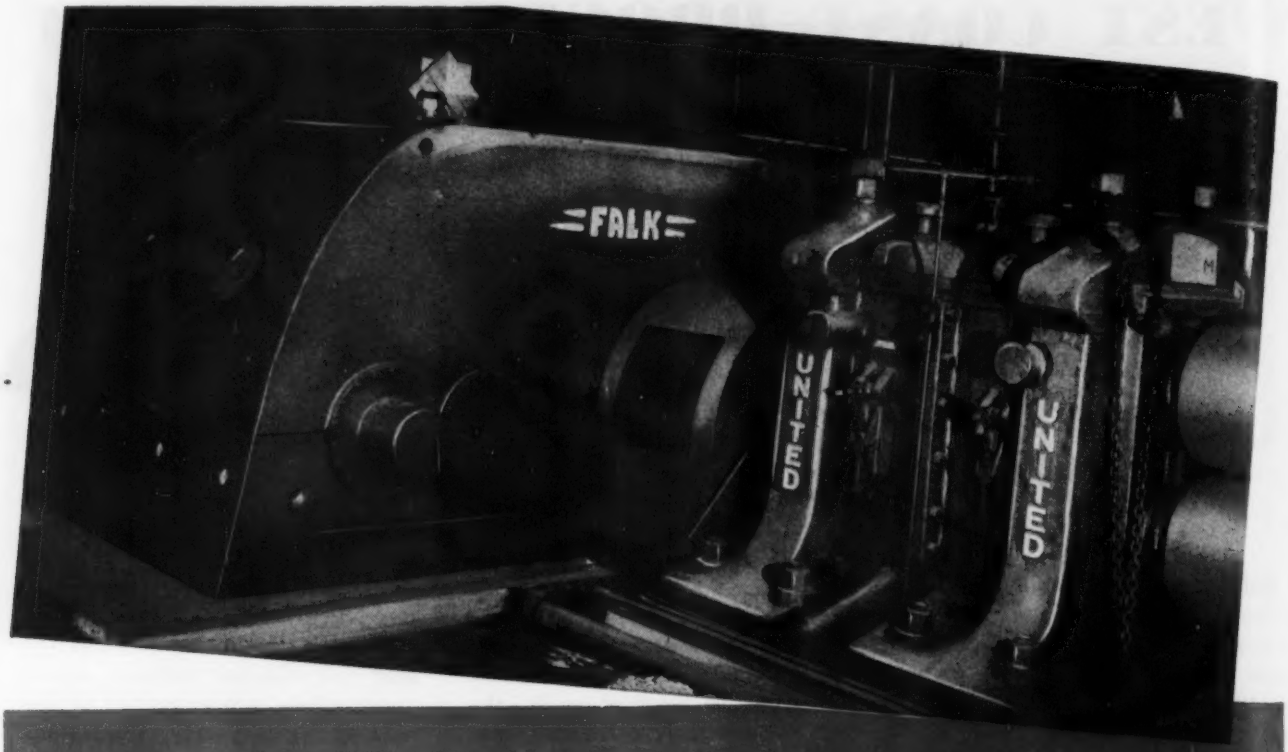
Pushes Production — Currently Columbia Steel Co., U. S. Steel subsidiary at Pittsburg, Calif., is pushing production for all it is worth. Last week the company leased steelmaking facilities of the government-owned foundry at Pittsburg which since the war has been closed with the exception of one brief operating period when Pacific States Steel utilized furnaces there for making ingots for its Niles, Calif., rolling mills. There are two 25-ton open hearths and one electric furnace which can produce approximately 60,000 tons of ingots yearly. Operations are scheduled to begin within 2 or 3 weeks.

Scrap Melee—With steel furnaces of the West ravenously consuming scrap at record levels, the anticipated shortage of steelmaking grades is becoming apparent (THE IRON AGE, April 13, p. 70).

Last week the price of steelmaking grades went up $1.50 a ton in Los Angeles and $4.00 per ton in Seattle. Other increases are not unexpected for this week. While shortages are not acute nor are buyers greatly concerned, it is admitted that No. 1 heavy is becoming scarce. Availability of bales in good quality and quantity is one source of consolation.

Some easing of the supply situation may occur with the importation of foreign steel scrap for which negotiations are now in progress.

Of Unskilled Type—Publication of the fact that the U. S. Air Force had issued letters of intent to 14 aircraft companies to get into production on $4,327,000,000 worth of planes brought job seekers to West Coast aircraft plants in considerable numbers. However, as was the case earlier this month, most of the applicants were of the unskilled type not now needed.



SAVINGS YOU CAN GET YOUR GEAR TEETH INTO

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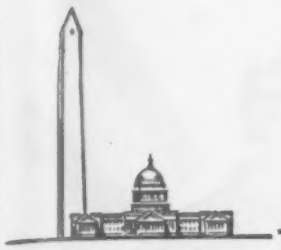

THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

By EUGENE J. HARDY

End to Dollar Gap—The vastly expanded military aid program, now totaling $5.22 billion for the current fiscal year, is expected to end Western Europe's dollar shortages, but it will also lower European standards of living and retard economic recovery. Marshall Plan officials say that this is so because one of the objectives is doubling the output of military goods in Europe which means substantial diversion of productive effort.

The program will, however, increase the dollar earnings of Western Europe since much of the added $4 billion in military aid will be spent outside the U. S. In addition to direct shipments of arms and production equipment it is planned to buy similar supplies in other countries.

Raw Stuff for Arms—Raw materials will also be bought from foreign nations and their dependencies. They will be processed into armaments in European countries, also financed by the U. S. and then turned over to recipient countries. There is also the possibility that more equipment for U. S. forces will be bought outside the country. Such an agreement with Canada is already in effect. Finally, stepped-up stockpile buying will also increase European dollar reserves.

Dismantling Doubts — The dismantling chickens are coming home to roost. In recent testimony on military aid, acting ECA administrator William C. Foster termed the economic resources of Western Germany as "basic to the attainment of military strength as to the accomplishment of a healthy economic recovery in Europe."

Predicting shortages of steel and other basic elements that go into military production, Mr. Foster stated that German facilities "can become an important factor in the common defense effort."

Job Almost Completed—On June 15, only 24 plants remained to be destroyed and these were an average of 84 pct dismantled. The British Zone held 19 of these. There were eight steel plants still to be completely dismantled—all in the British Zone. From March 31 to June 15, the British had wrecked six other steel plants.

Always in the forefront of dismantling, the British have not only destroyed sources of competition, but have increased the load on the American taxpayer who is now asked to rebuild Europe's military strength in addition to providing economic aid under the Marshall Plan.

Korean Tungsten—The Korean "police action" has resulted in the cutting off of imports of about 100 tons of tungsten concentrates a month, most of which had been going into the strategic stockpile. ECA had allocated some $300,000 for machinery which would have doubled output by 1952.

In 1948, imports from Korea amounted to about 1000 tons, or 10 pct of U. S. consumption. This dropped to about 340 tons in 1949, or only 5 pct of U. S. consumption. ECA aid was expected to boost 1950 output to 1750 tons, with 1500 tons coming to this country. By 1952 output would have been up to 2000 tons.

Steel Cartridge Cases — The Army and Navy have again dragged out their plans for using steel cartridge cases for all types of ammunition. During World War II, steel cases were used for some small caliber ammunition. Shortages of brass, actual and potential, make it necessary to consider broader usage. There have been repeated attempts to set up a standby steel case plant.

Inadequate appropriations are cited as the official reason for the lag in program. Actually, no one fought very hard for the funds and failure to get the program moving can be chalked up to Defense Secretary Louis Johnson's political "economy" program.

Investigations Galore—The current mobilization job is slated to be the most closely investigated in history. Already, there are ten active subcommittees probing into the various aspects of the mobilization effort.

In the Senate there is a seven-man investigating subcommittee of the Armed Services Committee headed by Sen. Johnson, D., Tex. The first task to be tackled by this group will be a determination of the scope of the mobilization job covering manpower and materiel.

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FEATURE ARTICLES

STEEL Behind The Iron Curtain

PART II

Russia's Far Eastern steel facilities are meagre. Main production and consumption are in the Ukraine and Ural areas. Few standard alloy steels are being produced and most tool steel production is of straight carbon type. But several areas in North Korea and Manchuria could become a major industrial empire.

By DEMITRI B. SHIMKIN
Russian Research Center, Harvard University, Cambridge, Mass.

EAST of the Urals, the only important steel mill is located at Stalinsk in the Kuznetsk Basin. This plant enjoys extraordinary coking coal resources, 57 pct of the Soviet total, and is served by small deposits of fire clay and manganese. But its iron resources are small and poor; in 1937, seven-eighths of the supply came from Magnitogorsk, counter-balancing the flow of coal to the Urals. The Kuznetsk Basin supplies the rich agricultural regions of Western Siberia and vast areas to the north and east. From the Kuznetsk Basin to the Pacific only the small mill of 200,000 metric tons capacity at Komsomol'sk and a tiny one in the Transbaikal operate today. The Komsomol'sk plant, supplying naval construction and ordnance output in the Far East, has long been plagued by a lack of iron ore, and fed by transfusions of scrap from the west.

Finally, Kazakhstan and populous Central Asia completely lack steel ingot capacity. A steel mill contemplated near Karanganda will meet these needs—provided enough iron ore can be discovered in the area, and provided too that a railroad connecting Karaganda and Central Asia is built.

Soviet-dominated areas of Eastern Europe and the Far East differ fundamentally in their present outputs of steel and of steel-making raw materials, in their potentialities for development, and in their long-term economic significance to Russia.

In 1947 the steel ingot production of the European satellites together was some 5.2 million metric tons, nearly 40 pct that of the Soviet Union itself. But this production was based primarily on imported materials, although a large surplus of coke and probably of fluorspar was available in exchange. Thus imports, especially from Sweden, provided over 70 pct of the iron ore consumed. The local supplies of manganese, chrome, molybdenum, nickel, cobalt, vanadium, and andalusite were also deficient or completely lacking.

Furthermore, an examination of the resource position of the Eastern European states, which have been fairly well explored geologically except for Bulgaria and Albania, shows that this pattern has to continue. Only in chrome and vanadium can the situation be readily altered. Therefore, should the Soviets not alter the situation, the maintenance, let alone the expansion.

of steel production in Eastern Europe would represent much more of a drain on, than an addition to, Russia's resources.

Manchuria and North Korea, in contrast, produced almost a million metric tons of steel ingots in 1943 and 1944 as shown in Table III. The present openhearth capacity of these regions, which were subjected to thorough-going Russian stripping at the end of World War II, may even be lower. But these Far Eastern areas were developed by the Japanese essentially as producers of raw materials and semi-finished products, such as pig iron. Consequently, their capacities and wartime outputs of such materials were much more impressive.

Far East Has Rich Deposits

The pig iron capacity of Manchuria and Korea in 1944 exceeded Russia's present total east of the Urals by 1/3. Exports to Japan in 1944 included 551,000 metric tons of pig iron, 619,000 metric tons of iron ore concentrates, and substantial quantities of magnesite, fluorspar, graphite, tungsten, and molybdenum. Southern Korea supplied manganese. Finally, the resources already established in Manchuria and North Korea are extremely large as shown in Table IV and the map. Only chrome, nickel and cobalt are unlikely to be found in significant quantities in this area.

Manchuria and North Korea can supply sorely needed tungsten, molybdenum and good-grade graphite to the USSR. Above all, control and development of their resources can revolutionize Russia's presently weak strategic position in Eastern Asia. One should recall the paucity of iron ore reserves in Siberia and the lack of resources for the only Soviet steel mill in the Far East, Komsomol'sk, with a capacity of some 200,000 metric tons. It is evident from the map how readily pig iron and ferro-alloys from Seishin and Joshin can be transported to Komsomol'sk. Other Manchurian and North Korean capacities at Anshan, Penshihu and Kenjiho are accessible to Russian-held Port Arthur and Dairen. Furthermore, these metallurgical centers, and possibly another near Tungpientao, can be developed greatly, making possible the rise of a first-class, Soviet-controlled, industrial empire in the Far East. The political implications of these facts have recently become apparent.

In the Far East, the Anshan-Penshihu area south of Mukden in Manchuria is characterized by the proximity of one to four billion tons of iron ore, over 700 million tons of coking coal, and enormous magnesite reserves. All Manchurian pig iron capacity, 2.5 million metric tons in 1944, is located here. The other important potential exists in the combination of Manchuria and North Korea, centered on the port of Rashin.

Railroads built during World War II link together 600 million tons of northeast Manchurian (Haoliking) coking coal reserves with large quantities, possibly a billion tons, of high to fair grade iron ores in North Korea, which itself lacks coking coal. Railroad connections with the Soviet Far East also are in operation. Although North Korea produced 568,000 metric tons of pig iron in 1943, current output is not known.

Soviets Need Alloying Elements

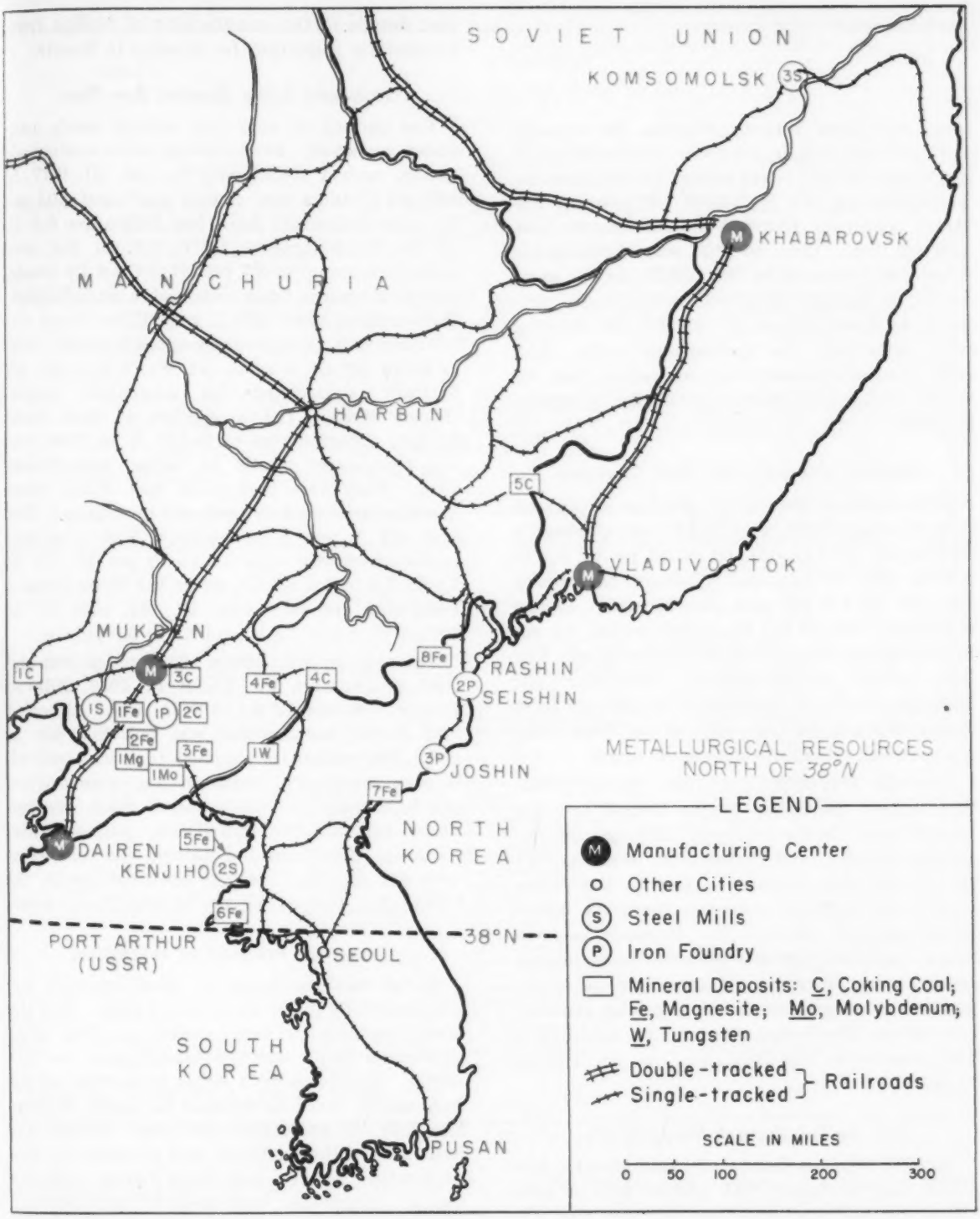
In 1937, the USSR was a significant exporter only of manganese, among the steel-making minerals. In addition, it was self-sufficient in iron ore, coking coal, the refractories, fluorspar, and metallurgical chromite. Imports covered current Russian needs and stockpiling in cobalt, molybdenum, nickel, tungsten, and vanadium; in fact, Russia produced no cobalt, and obtained vanadium indirectly, as naturally-alloyed pig iron from the Kusa ores. Marked concentration of output existed: three deposits, Krivoi Rog, Magnitogorsk and Bakal, produced 83 pct of all Soviet iron ore; two fields, the Donets and Kuznetsk Basins, all coking coal; two deposits each, 70 pct of the dolomite and all manganese; 94 pct of the magnesite and all andalusite came from one deposit each. One smelter, Verkhne Ufalei in the Central Urals, produced all Soviet nickel, although the equivalent of another 1000 tons was gained in naturally-alloyed pig iron from Khalilovo ore. Only fire clay, fluorspar, graphite and tungsten outputs were decentralized. Finally, ore-dressing technology was poor.

Inadequate concentration and agglomeration of iron ore—even in 1940, 82 pct of the ore was marketed raw—resulted in losses of some 12 pct of the iron content charged in blast furnaces. In addition, concomitant selective mining began to downgrade reserves, especially at Krivoi Rog, Magnitogorsk and Tula. Only two-thirds of the Donets and none of the Kuznetsk coking coal were washed. Recoveries ranged from respectable, e.g. 80 pct in manganese concentration at Chiatura to abysmal: an average of 47 pct for fluorspar; from 19 to 52 pct for graphite; and 56 pct for tungsten.

Coking Coal In Short Supply

The net changes in Soviet development of deposits during the subsequent years have been surprisingly few. Chromite has joined manganese as an exportable surplus and self-sufficiency in nickel has been achieved, while cobalt, molybdenum and tungsten outputs, although still small, have sharply increased. On the other hand, acute shortages of coking coal troubled the USSR after the war, at least up to 1947, and the supply of andalusite was gravely deficient in 1949.

The distribution of operating mineral deposits



is now fundamentally the same as it was before World War II. Krivoi Rog resumed a major role in 1947, after 14 million cubic meters of water had finally been pumped out. Kerch, however, seems to have been abandoned. The Donbas is again a major coking coal producer; although Karaganda and Vorkuta as well as the Kuznetsk Basin are now significant.

True, the patterns of nickel-cobalt and molybdenum production have greatly altered. Orsk, Petsamo, Monchegorsk and Noril'sk have replaced the small Verkhne Ufalei nickel mines. By 1946, the Kounrad smelter in Kazakhstan was concentrating 60 pct of Soviet molybdenum, partly as a by-product from its own copper ore, and partly from Vostochnyi Kounrad molybenite ore. Finally, a rich chromite deposit discovered in 1937, Kempirsai, has overshadowed poorer Sarany. Some technological progress has been realized.

Iron ore agglomeration has increased greatly in comparison with pre-war practice, and scat-

tered data show better recoveries, for example a 75 pct recovery in tungsten concentration at Tyrny-auz in 1947. But indications of gross inadequacies are still abundant. At present, Kuznetsk coke runs 13.5 pct and Karaganda coke, 15.6 pct ash. Only in 1946 was stellite-grade cobalt first produced in the USSR. In the same year, the copper byproduct molybdenum produced at Kounrad carried but 10.1 pct Mo. and was usable only for molybdenum salts. And difficulties in concentrating ore rather than resource deficiences caused andalusite shortages in 1949.

Postwar Product Mix Has Changed

Prior to World War II the structure of pig iron output in the USSR comprised 66 pct openhearth and duplex steel grades; 0.3 to 1.5 pct Si, 1.2 to 3.5 pct Mn; 20 cast-iron grades, with lowered Mn, 0.5 to 1.3 pct and less stringent silicon standards; 9.5 pct pct Bessemer grades, 2.5 pct basic-slag pig iron, and 2 pct special types. The last include low-phosphorus, low-sulfur pig irons prepared with special coke or charcoal from Bakal ores and naturally-alloyed pig irons from Pervoural'sk, Khalilovo and other areas.

Between 1927-1928 and 1938, Soviet ferroalloy output multiplied nearly tenfold to some 491,000 tons. In the later year, although spiegel, ferromanganese, and ferrosilicon comprised 95 pct of the total, over a quarter of the ferroalloys were produced in electric furnaces. Later output data are unavailable. However, in 1947 output included ferrophosphorus, ferrochrome, ferrotungsten, ferromolybdenum, ferrovanadium and ferrotitanium, as well as the most common ferroalloys. The Soviet standards for ferroalloys prescribe lower contents than in the United States.

Hot Rolled Output Stepped Up

In 1938, after a decade of rapid growth, the USSR was producing 12.1 million m.t. of hot-rolled iron and steel and steel castings, plus 2.7 million m.t. of cast and malleable iron. This output was 34 pct and 32 pct that of the U. S. in 1937 and 1949, respectively. However, the proportion of the Soviet rail production within this total was three times as high; that of iron and steel castings, structural shapes and bars was 46 pct compared to 36 pct. In contrast, the ratio of alloy steel, pipes and tubes, and wire rods to total production was low. Exceptionally so was plate, sheet and strip production. This reflected not only the weakness of new Soviet consumer's good industries, such as passenger cars and canned goods, but also a decline over the past decade in the manufacture of roofing iron, particularly important for housing in Russia.

Standard Alloy Grades Are Few

The variety of alloy and special steels produced was small. Most common were controlled-quality carbon steels, with 0.3 pct Ni, 0.17 to 0.37 pct Si and a max of 0.04 pct P and 0.04 pct S. Also important were low chromium 0.8 to 1.1 pct Cr, manganese 1.4 to 1.8 pct Mn, and nickel-chrome up to 3.7 pct Ni, 1.7 pct Cr steels, especially used in truck and tractor manufacture. One stainless steel, EZh 1, with 12 to 14 pct Cr, predominated. A chrome-manganese-nickel steel 12 to 14 pct Cr, 8 to 10 pct Mn, 4 to 5 pct Ni partially substituted for austenitic nickel-chrome steels. The production of tool steels actually exceeded that of the U. S. in 1940, but was represented mostly by carbon and chrome steel. Only two high-speed tool steels were manufactured, and in moderate quantities. The first, RF 1, was a conventional high-tungsten-vanadium-chrome steel 17 to 19 pct W, 1.0 to 1.4 V, 3.8 to 4.6 pct Cr, while the second was a lower-standard substitute, EI 184, with 3.5 to 4.8 pct W, 1.0 to 1.5 V, and 7.0 to 9.0 pct Cr.

The consumption pattern of hot-rolled iron and steel products in the USSR in 1938 differed greatly from that of the U. S. in 1940. Although total Soviet consumption was but 35.5 pct as great, the quantities supplied tools and miscellaneous machinery, ordnance and ammunition, and lumbering and mining were much greater. Those supplied the automotive, ship-building, container, petroleum and natural gas industries were far smaller. Exports were lacking in the USSR, but formed 17 pct of the U. S. total.

Ordnance Production Increased

Soviet wartime losses of steel capacity approximated 58 pct of the national total. But the scrap available increased greatly, so that steel production could shift predominantly to this source. Consequently, a larger proportion of pig iron output could be devoted to direct casting, especially of projectiles and shell casings for light and medium artillery and mortars, as well as bombs. Alloyed cast irons found extensive use in automotive and aircraft manufacture, even for such parts as valves, piston rings, and ball bearings.

Thus, although the output of pig iron declined between 1940 and 1942 from 15.0 to some 6.0 million tons, and of raw steel, from 18.3 to some 9.0 million tons, rolled iron and steel products and castings fell only from about 16.0 to some 8.0-8.5 million tons. Furthermore, the production of controlled quality iron and steel actually rose, approximately from 2.8 to 3.6 million tons, in accord with wartime needs. Several new alloy steels, including a vanadium-bearing spring steel, were standardized. The consumption of ferrous products for ammunition also rose, from

TABLE III

STEEL PRODUCTION IN MANCHURIA AND NORTH KOREA

In Metric Tons

Region	Capacity or Reserves	Output (1943/44)**	Net Balance (1943/44)**
Manchuria	Pig iron: 2.5 million.** Iron ore: 1.8–4.4 billion (35 pct Fe, 40–45 pct SiO_2, 0.3 pct Mn, low P and S). High-Fe ores, 114 million; also manganiferous (2 pct Mn). Coking coal: 1.4 billion. Magnesite: 200–5000 million. Fireclay: 90 million. Mo: 30,000.	Steel: 843,000. Pig iron: 1,727,000. Iron ore: 5.3 million (incl. concent.). Coke, fireclay: Unknown. Magnesite: 401,000 (1938). Mo: 516.	Surplus: Pig iron, iron ore, magnesite, Mo (coke), (fireclay). Deficient: Mn. Lacking: All others.
North Korea	Steel: 120–300,000.** Pig iron: ca. 700,000.** Iron ore: ca. one billion incl. 200 million min. 38–51 pct. Fe, low P and S. Coking coal: Negligible. Large CaF_2, graphite (90 pct amorphous), CaF_2 W. Probably small: Ni, Mo.	Steel: 112,000. Pig iron: 607,000. Iron ore: 3,581,000. Coke: 733,000. CaF_2: 68,800. Graphite: (90 pct amorphous), 58,000. W, 3,800. Ni, 443. Mo, 80.	Surplus: Pig iron, iron ore, CaF_2, graphite, W, Ni, Mo. Lacking: All others.
Total	Pig iron: 3.2 million.** Iron ore: 2.8–5.5 billion. Coking coal: Ca. 1.4 billion. Magnesite: 200–5000 million. Fireclay: 90 million. Large CaF_2, graphite, Mo, W. Small Ni. Lacking: Cr, Co, andalusite. V not clear.	Steel: Ca. 950,000. Pig iron: 2.3 million. Iron ore: 8.9 million. Magnesite: 401,000 (1938). CaF_2, 68,800. Graphite: 58,000. W: 3,800. Mo: Ca. 600. Ni: 443. Coke, fireclay: Not clear.	Surplus: Pig iron, iron ore, magnesite, CaF_2, graphite, W, Mo, possibly coke. Probably adequate: Fireclay. Deficient: Ni, Mn. Lacking: Cr, Co, V, andalusite.

* Percentage covered by output. ** Manchuria, 1943; N. Korea, 1944.

TABLE IV

FAR EASTERN METALLURGICAL RESOURCES

In Metric Tons

Symbol	Material	Location	Reserves or Capacity	Output
1 S	Steel	Anshan (M)	Steel, 1 million ? (1944) Pig iron, 2 million (1944)	Steel ingot, 843,000 (1943) Pig iron, 1,325,000 (1943)
2 S		Kenjiho (K)	Steel, 120,000 (1944) Pig iron, ?	Steel, 112,000 (1944) Pig iron, 484,000 (1944)
3 S		Komsomol'sk (R)	Steel, 200,000 Pig iron, ?	Steel, ca. 200,000 (1947) Pig iron, ?
1 P	Pig Iron	Penshihu (K)	Pig iron, 511,000 (1944)	Pig iron, 401,700 (1943)
2 P		Seishin (K)	Pig iron, ?	Pig iron, 29,014 (1944)
3 P		Joshin (K)	Ferro-alloys, ?	Ferroalloys, 10,700 (1944)
1 C	Coking Coal	Paipiao (M)	Coal, 250 million	Not known
2 C		Penshihu (M)	Coal, 220 million	Not known
3 C		Fushun (M)	Coal, 950 million	Not known
4 C		Tungpientao (M)	Coal, 236 million	Not known
5 C		Mulin (M)	Coal, 300 million	Not known
1 Fe	Iron Ore	Anshan (M)	Iron ore, 1 to 4 billion (35 pct Fe), 49 million (50 + Fe)	Iron ore, 3,125,000 (1943)
2 Fe		Kung-ch'ang-ling (M)	Iron ore,268 million (30 to 69 pct Fe)	Iron ore, ?
3 Fe		Miao-erh-kou (M)	Iron ore, 400 to 500 million (34 to 39 pct Fe, <1.7 pct Mn); 5 to 10 million (59 to 71 pct Fe)	Iron ore, 1,125,103 (1943)
4 Fe		Talitzukou Group (K)	Iron ore, 190 million (35 to 63 pct Fe)	Iron ore, 850,000 (1943)
5 Fe		Kosei (K)	Iron ore, res. unk., 48 pct Fe	Iron ore, 503,000 (1944)
6 Fe		Sainei (K)	Iron ore, res. unk., 50 pct Fe	Iron ore, 122,000 (1944)
7 Fe		Rigen (K)	Iron ore, res. unk., 49 pct Fe	Iron ore, 314,000 (1944)
8 Fe		Mosan (K)	Iron ore, 200 to 400 million, 38 pct Fe (concen. to 56 pct)	Iron ore, 1,100,000 (1944)
1 Mg	Magnesite	Tashihkiao Reg. (M)	Magnesite, 200 to 5000 million	Magnesite, 401,000 (1938)
1 Mo	Molybdenum	Yang-chia-chang-tzu	Molybdenum, 30,000	Molybdenum, 516 (1944)
1 W	Tungsten	Jeto (K)	Tungsten, 50,000 ?	Tungsten, unk.

Locations: (K), North Korea; (M), Manchuria; (R), USSR.

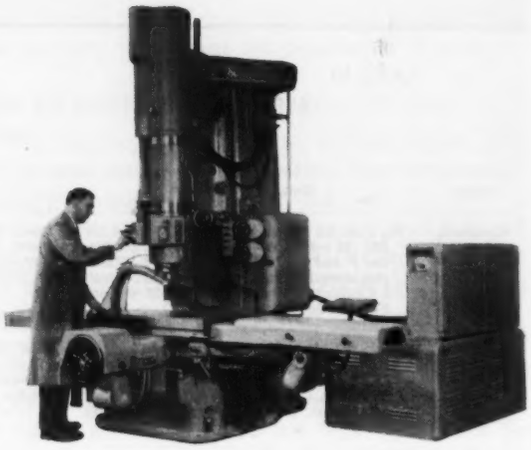
830,000 tons in 1940 to 1.8 million tons in 1942, and 2.4 million tons in 1943. In contrast, rolled products used in construction fell from some 2.95 million tons in 1940 to about 540,000 m. t. in 1942. Lend-Lease imports of iron and steel, totaling 1,063,000 long tons (1941 to 44), added about 5 pct to Soviet supplies during the war.

The Fourth Five-Year Plan (1946 to 50) contemplated increasing steel ingot output to 25.4 million tons, and rolled products, to 17.8 million. The proportion of cast iron was to decrease. Electric-furnace steel was to rise to 1.38 million tons by 1950, a 50 pct increase over 1940. Finally, the structure of rolled iron and steel production was to remain almost identical with that of the late pre-war period, the major change being a substantial increase in pipes and tubes.

By 1945, Soviet steel ingot output had recovered to 11.2 million tons, and rolled iron and steel, to 7.2 million tons. The 1948 figures were 17.0 and 11.9 million tons, respectively, while 1949 production reached new heights at 21.2 of steel ingots and 15.1 million tons of rolled products. On the other hand, product diversification has lagged. Despite ambitious plans formulated in 1943-44, few alloy steels were added to standard production between 1944 and 1947. The most important included a high tungsten-cobalt tool steel (RK 10) and two ball-bearing steels.

This concludes a two-part article.

Vertical Precision Hole Grinders ARE VERSATILE



By **HENRY E. DURKEE**, Design Engineer
Pratt & Whitney Div., Niles-Bement-Pond Co.
West Hartford, Conn.

Awkwardly shaped parts that cannot be handled on conventional bore grinders can be accommodated on this unit. Greater sizing accuracy and better finish is obtained than is possible by boring. Unit locates and finishes to 0.0001-in. accuracies.

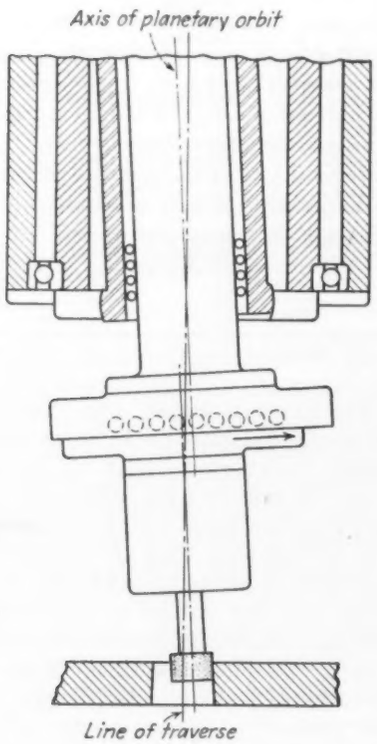


FIG. 1—The outer spindle axis coincides with the hole centerline and controls its location. The inner or traverse spindle is inclined at an angle to produce tapered holes.

THE operation of a vertical spindle planetary-type grinder is based on the principle of holding the work stationary, utilizing the ease of accurate work location found in the jig borer, and grinding to size with a high speed wheel head having an accurately governed planetary motion. This precision hole grinder permits economical locating and finish grinding of many holes and surfaces in a large variety of work, including awkwardly shaped components

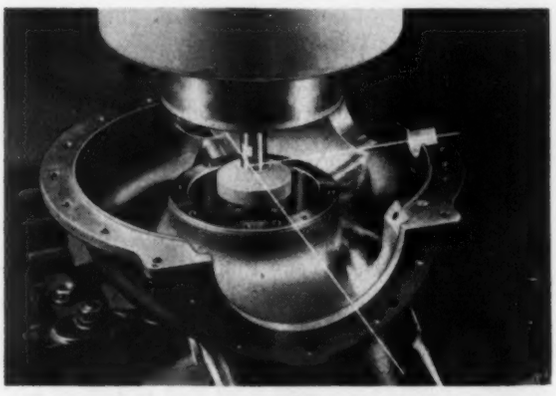


FIG. 2—Hole being ground in steel liner of cast magnesium helicopter differential housing is located at the centerline intersection of three semicircular openings.

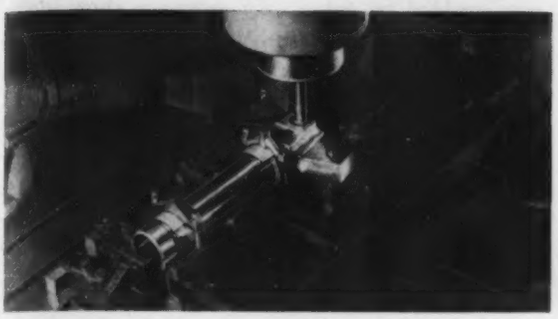


FIG. 3—This 1.4994 ± 0.0001-in. flange hole is located and ground on center of longitudinal spindle axis, perpendicular to ground face of flange in 15 min.

that cannot be handled on the conventional rotative-type bore grinder.

Greater sizing accuracy and better finish is obtained than is possible by boring. However, of more importance is the fact that holes in hardened components can be quickly ground to size, and at the same time corrections in location can be made to meet the increasing demand in modern industrial design for closer tolerances in location, size, and finish holes.

The method of precision locating is the same as used in the Pratt & Whitney jig borers. Power rapid traverse is provided to both carriage and table for setup and rough positioning.

The machine is extremely versatile, especially when equipped with a rotary table. It is powered to take heavy roughing cuts. This enables it to ecoomically grind short-run production jobs that would normally require costly fixtures, or that would be too cumbersome to mount on a rotatable face plate.

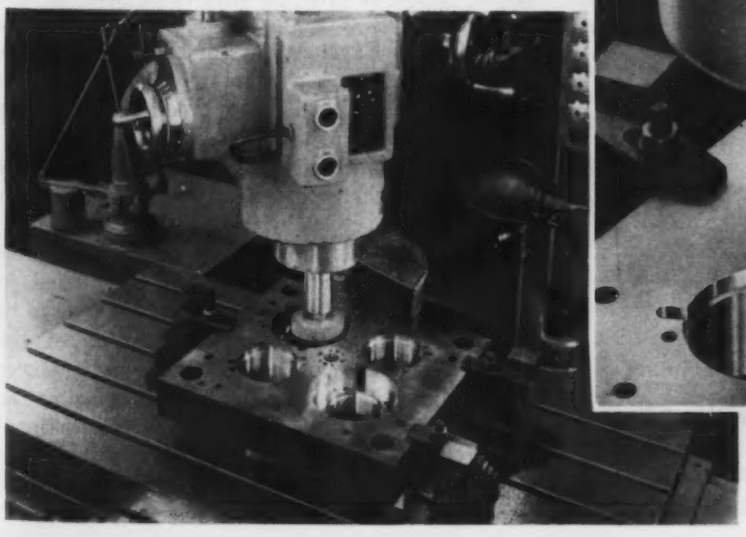
In operation, the grinding spindle Fig. 1, has a planetary motion about the vertical axis of the hole being ground. It can be fed outward in an increasingly larger radius, until the hole is finished to size. The axis of the main or outer spindle coincides with the axis of the hole, and controls its location. The inner or traverse spindle upon which the wheel head with its adjustable cross slide is mounted is hardened, ground and lapped. In operation, this spindle reciprocates vertically in a hardened, ground, and lapped sleeve on pre-loaded ball sleeve bearings. This inner spindle can be inclined at an angle relative to the main spindle to produce taper holes.

The wheel feed operates through planetary gears and a feed rod through the center of the traverse spindle to a feed screw on the wheel head cross slide. The feed can be operated either while the traverse spindle is running or idle. This design is unique to this type of machine, as are also the electrically motorized wheel heads.

These heads have built-in shell type motors. The rotors of these motors are assembled directly on the wheel spindle. Electric current for operating the heads is transmitted through collector rings on the upper spindle and cabled through the spindle to a convenient outlet inside the cross head guard. Heads are quickly mounted with tri-lock threads. Only 1/6 of a turn is required to lock them in position. They are automatically connected to air lines for cooling the motors.

Several types of wheel heads have been developed to cover a range of speeds from 3600 rpm for heavy duty large bore and face grinding, up to 54,000 rpm for holes down to 1/16 in. or less in diameter. Each head has eight available speeds. These are obtained through a 7½ hp, adjustable speed motor-converter set having an overall 4 to 1 ratio. These speeds are controlled through a multiple contact drum switch.

Other advantageous design features of the machine are: (1) Either automatic cycle or hand feed to wheel traverse spindle, and independent



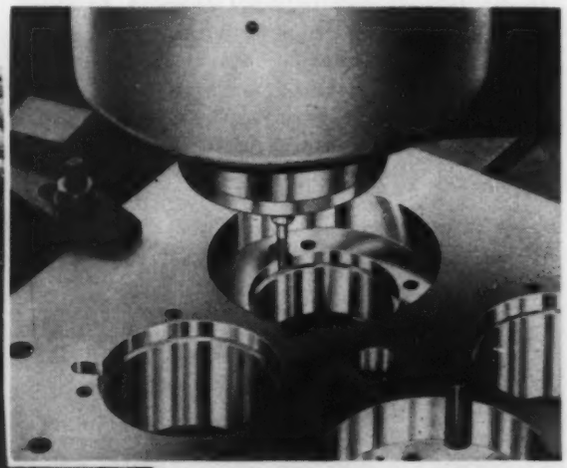


FIG. 4-A 2-hp, heavy duty grinding head grinding holes and counterbores in one of two mating halves of a casting die adapter. Insert shows a high speed spindle head grinding a slot.

jog buttons. (2) Fine or coarse wheel feed, with .0001 in. graduated dial, and counter for dial revolutions. (3) Push button control of spindle head position on column. (4) Convenient hand wheel and dial control of speeds of main spindle rotation, and vertical traverse spindle. (5) Lever controlled clutch and brake for main spindle rotation. (6) Depth indicator for face grinding.

The field of application of the large vertical precision hole grinder is quite broad. It is meeting many long existing needs of the aircraft industry. It is also finding new uses in: Tool and die shops on small and large jigs, fixtures and dies; in the plastics industry on molds and forces; and in numerous other shops for handling special parts, prototypes, and small-lot production. Several typical jobs are shown and briefly described in the following paragraphs.

The extensive use of magnesium castings, especially in the aircraft engine industry, presented new problems in hole finishing. This was bacause most of the holes require hardened liner bushings, the pressing in of which caused distortion and errors in hole location. These bushings can now be left undersize, and finish ground on the locating hole grinder. During this operation any error that may have occurred in locating can be corrected. Fig. 2 shows one of two halves of a helicopter differential housing. Holes in the liners in both halves were located exactly at the 90° intersection of center lines of three semicircular openings, and ground square with the hole.

Another example of adaptability and economical handling of small-lot production work is illustrated in Fig. 3. The hole in this helicopter rotor hub spindle was ground to 1.4994±.0001 in., exactly on centerline, and perpendicular to the flange face. A costly counterbalanced holding fixture for conventional rotative grinding was avoided by using only ordinary shop equipment and clamping the work to the machine table. Production time floor to floor was 15 min each. Higher production would have resulted if a simple fixture, designed for the job, had been employed.

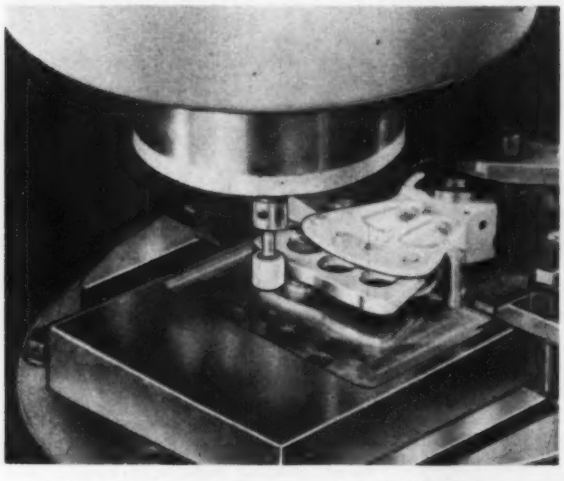


FIG. 5—This contour was produced without templates using a P&W rotary table attachment on the precision hole grinder.

In the production of piercing and blanking die sets, the holes in punch holder, die, and stripper plate can be quickly located and ground to match, in relation to guide post holes. Back taper can be ground if required, and slots with rounded ends as well as many circular forms can also be ground. The circular forms can be produced by mounting work on a rotary table.

Typical of this type of work is the casting die adapter, one half of which is shown in Figs. 4A and 4B. All holes, including guide post holes, were ground within .0002 in. tolerance for location. Counterbores were held to ± .0002 in. for depth. Keyslots were also ground to ± .0002 in. and flush at bottom. Bore diameters were ground to ± .0001 in. tolerance.

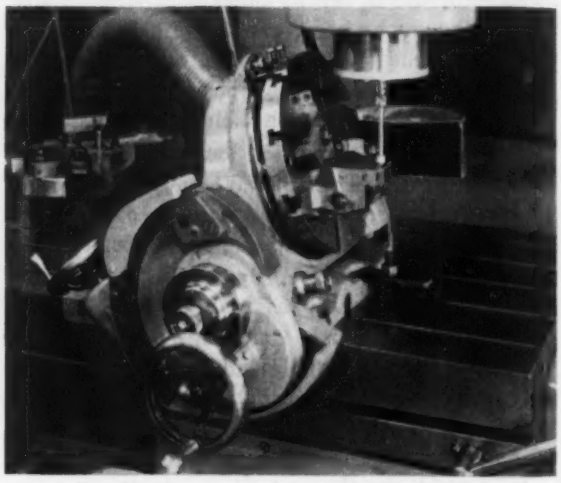


FIG. 6—The hole being ground in this hardened steel element has an 0.8750-in. diam and is at an angle of 16° with the bottom face.

Fig. 5 gives a good illustration of contour grinding in combination with the P&W rotary table. Contour was ground from end to end, and the greatest permissible error in contour was .001 in. Exact centers of the radii were located, and the work was rotated about each axis to a specified angle. No appreciable indication of blending from arc to arc was permitted.

Many components having holes at an angle, or spaced about their periphery, which are difficult to mount on a chuck without a holding fixture, can be quickly set up on a tilting rotary table and positioned for grinding, as illustrated in Fig. 6. Components having holes too large to be ground by using the planetary motion of the machine spindle can be mounted on a power driven rotary table, and ground by rotating the work in the same manner as in a conventional bore grinder. The advantage of this operation is in the ease with which the rotary table and workpiece can be mounted and located on center.

JETS

TEST DESIGNERS' AND METALLURGISTS' INGENUITY

Most progress in making better jet engines has been due to design changes. New alloys heat treatments and special processing have helped, but these are secondary. Conditions of thermal shock are being minimized, and high frequency vibration testing—although new—shows promise.

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DESIGN plays such an important part in most material selections that successful operation of a gas turbine is dependent on a compromise between material and design as well as availability and cost. Aircraft gas turbines present no more problems in their development than other types of engines. However they do present a different set of problems. As in most aircraft application, particularly for the military, long engine life tends to be sacrificed for performance. This trend is expected to continue, even though materials are substantially improved.

Parts in jet engines and turbo-superchargers which operate above 1200°F for some of their useful life are the limiting fundamental factors in setting periods of over-haul for this type of apparatus. This is not only because of the high temperature, but also because of the high stresses, both in rotating and stationary parts. The sources of high stresses in rotating parts come from high speeds, alternating loads and changing thermal gradients. Stationary parts are highly stressed primarily by the latter two only.

If a jet engine or turbo-supercharger part fails prematurely when given an operation test, it is important to know what caused the failure. Changes can then be made to prevent reoccurrence in the future. These causes can generally be assigned to (1) poor control of material processing or inspection, (2) poor control of test conditions, or (3) possible design deficiences.

Operating temperatures of the various critical jet engine and turbo-supercharger parts are listed in Table I. The combustion chamber liner normally operates at a max of 1800°F. Occasional hot spots due to poor fuel flow or pressure unbalance, can cause temperatures in excess of 2100°F. These hot spots are the direct cause of extreme thermal gradients and high thermal stresses, as well as distortion into the flame passage (at 3000°F) and eventual destruction of the metal liner. Fig. 1 shows modern liner after 300 hr, which shows no evidence of failure.

The performance of various materials, when tested as combustion chambers in engines, appears to have a definite relation to sheet metal tensile strength above 1800°F. A plot of performance time as a function of the tensile strength at 1800°F is shown in Fig. 2 on one set of engine test data. Increased ductility does not correlate with increased liner life; however, a certain minimum ductility is believed to be essential.

Materials of increased thermal conductivity

do not seem to be the direct solution to this problem of combustion liners because neither Inconel clad nickel nor stainless clad copper have produced exceptional life. The reason is believed to be the lack of strength to resist buckling due to thermal gradients. Most of the alloys which have been tested have about the same thermal conductivity at 1800°F. At lower temperatures, Fig. 3, there is a difference of substantial magnitude.

Ceramic coating of the metal liner, another approach to this problem, has not been particularly helpful at the present state of development unless the coating is quite thick. Thick coatings are not applicable to some designs of combustion liners which depend on small louvre openings to admit cool air to sweep the surface of the liner for effective cooling.

Another approach which has shown improvement in liner life has been to increase the wall thickness of the combustion chamber. The relation of strength to performance is believed evident, but added thickness results in additional weight. Therefore, increased metal thickness is not looked upon with favor.

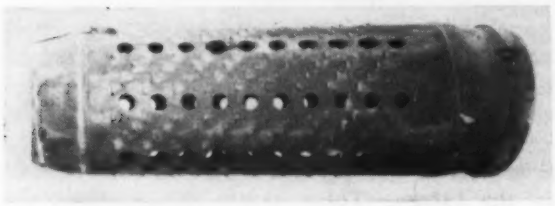


FIG. 1—Design D combustion chamber after 300 hr of engine testing. Material: type 310 Stainless.

Some progress towards a solution of this problem has been through new alloys, heat treatments, or special processing. More progress has come, however, through redesign of the combustion chambers to give proper louvre relation to air flow. This reduces thermal gradients and pressure unbalance. Also with good design, the luxury of highly strategic, costly materials are not required.

Diaphragm partitions are the next part met by the flow of hot gas from the combustion chamber. These partitions are stationary in the gas stream and serve to direct the hot gas into the turbine buckets in the designed manner. Their normal maximum operating temperature is 1650°F and with the better materials give little difficulty. If, however, the combustion system is not functioning as it should, the blow torch effect produced in the combustion chamber reaches the partitions and results in extreme over-heating. If the water-alcohol injection, which is a conventional procedure for improving the take-off thrust performance of jet engines, is not functioning properly, the diaphraghm can he subjected to a quenching action. Such malfunctioning of the combustion system causes high thermal gradients and accompanying high stresses, and if distortion does not occur, the stresses must be relieved by localized cracking. Good performance of a diaphragm partition under all possible conditions is a function of high temperature strength and ductility. The weak and very ductile materials buckle. They do not crack but lose their efficiency with respect to aerodynamic design. A strong material with possibly less ductility tends to crack rather than distort. The material which has a good combination of physical properties for application to the diaphragm is cast Vitallium, an alloy of C-Cr-Mo-Co.

A thermal shock test has proved the best lab test of diaphraghm partition materials. This test consists of alternate heating in a gas flame to 1700°F and water quenching to a fixed cycle, (4 min and 50 sec to 1700°F, water quench 10 sec). The appearance of a crack after thermal shock testing in the laboratory looks very much

TABLE I

HIGH TEMPERATURE GAS TURBINE PARTS

Physical Characteristics	Manufacture
Jet Engine—Combustion Liner 900° F to 1800° F	
Oxidation-Corrosion	Sheet
Thermal Shock	Formable
Strength	Weldable
Ductility	.....
Thermal Conductivity	.....
Thermal Expansion	.....
Jet Engine Diaphragm Partition 900° F to 1650° F	
Oxidation-Corrosion	Castable
Thermal Shock	Weldable
Jet Engine & Turbo-supercharger Turbine Wheel 400° F to 1200° F	
Creep	Forgeable
Strength—Low Temperatures	Machineable
Ductility	Weldable
Jet Engine & Turbo-supercharger Turbine Bucket 1200° F to 1500° F	
Creep	Forgeable
Stress-rupture	Machineable
Fatigue Strength	Weldable
Thermal Shock	.....
Ductility	.....
Oxidation-Corrosion	.....
Jet Engine Tailcone 900° F to 1400° F	
Thermal Shock	Sheet
Fatigue Strength	Formable
Oxidation & Corrosion	Weldable
Turbo-supercharger Nozzle Box 1200° F to 1650° F	
Oxidation-Corrosion	Sheet
Fatigue Strength	Formable
	Weldable
Turbo-supercharger Diaphragm 1200° F to 1650° F	
Oxidation-Corrosion	Castable
Thermal Shock	Weldable

TABLE II

ALLOYS USED IN J 47 ENGINE

Alloy Name	C	Cr	Ni	Mo	W	Cb	Co	Ti	Al	Fe
S-816	0.40	20	20	4	4	4	44	...	...	4
Vitallium	0.25	28	2.5	5.5	...	...	62	...	...	1
Hastelloy "C" (cast)	0.10	15	57	17	4.5	...	...	...	...	5
Hastelloy "B"	0.10	...	64	28	...	...	...	...	...	6
Type 302	0.08	18	8	...	...	...	...	...	...	Bal.
Type 310	0.08	25	20	...	...	...	...	...	...	Bal.
Type 347	0.08	18	11	...	...	0.80	...	...	...	Bal.
Type 321	0.08	18	12	...	...	...	...	0.48	...	Bal.
Type 316	0.08	18	12	2.25	...	...	...	...	...	Bal.
Inconel	0.05	13	78	...	...	...	...	...	...	7
Inconel "B"	0.05	15	76	...	...	...	...	...	...	7
Inconel + 3% Al	0.05	13	75	...	...	...	...	...	3	7
Inconel "X"	0.05	15	73	...	...	1	...	2.5	0.5	7
6059 (cast)	0.40	27	32	6	...	...	32	...	...	1
25-12 (cast)	0.15	25	12	...	...	...	...	...	...	Bal.
19-9-DL	0.30	19	9	1.2	1.2	0.30	...	0.30	...	Bal.
190 (cast)	0.40	27	2	...	5	1	66	...	...	1

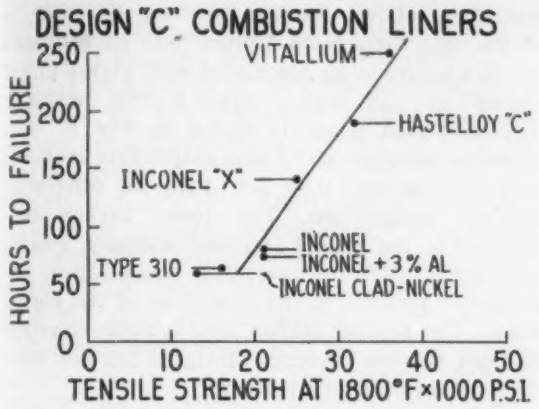


FIG. 2—Comparison of materials when engine tested as a design C (obsolete) combustion chamber in an accelerated life test. Hours to failure vs tensile strength at 1800°F.

like a cracked partition after encountering faulty operation conditions in an engine.

Several cast materials have been evaluated in the laboratory thermal shock test. Fig. 4, in which cast Vitallium with 0.20 to 0.35 pct C has been shown to be superior. In this test cast 25 Cr 12 Ni did not crack, but instead warped and distorted badly.

Engine tests have been run wherein the diaphragm contained partitions of cast type 309, type 310 and Vitallium as well as fabricated partitions from type 310 sheet. In these tests cast Vitallium has shown outstanding performance.

The turbo-supercharger operates on the exhaust gas of a reciprocating engine. It consists of a gas turbine for driving a compressor to increase the pressure of air delivered to the engine.

The turbo nozzlebox which receives the hot exhaust gases from the reciprocating engine is

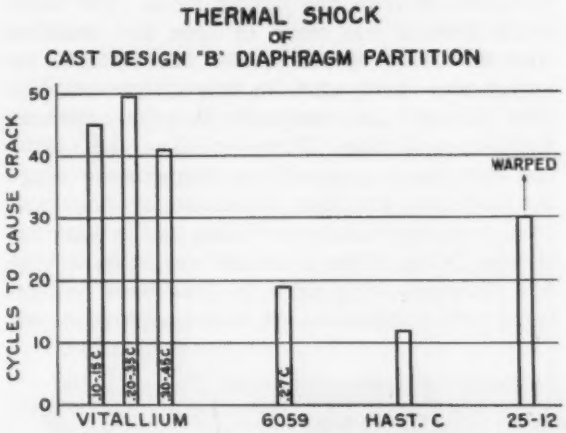


FIG. 4—Laboratory thermal shock test of design B diaphragm partition. Cycles to cause crack vs materials tested are shown. Thermal shock cycle consisted of heating to 1700°F in gas flame in 4 min—50 sec and water quenching for 10 sec.

made up of formed and welded sheet metal and has a cast diaphragm as an integral part of its construction. Loading of this assembly in an airplane which operates at temperatures between

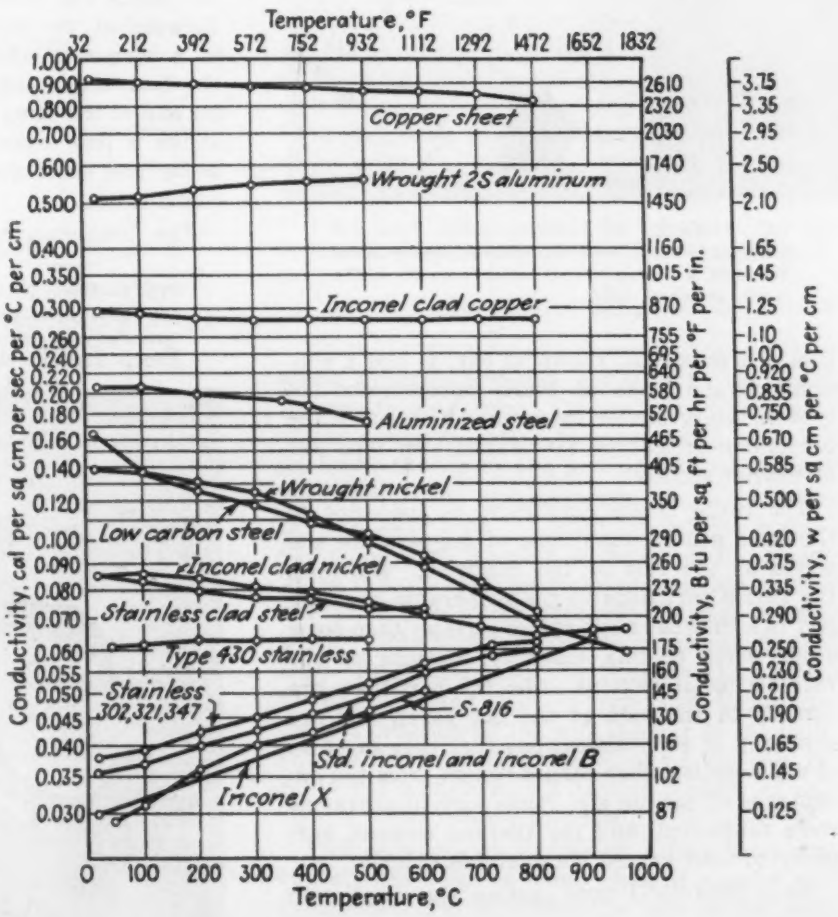

Temperature, °F
32 212 392 572 752 932 1112 1292 1472 1652 1832
Conductivity, cal per sq cm per sec per °C per cm
Conductivity, Btu per sq ft per hr per °F per in.
Conductivity, w per sq cm per °C per cm
Copper sheet
Wrought 2S aluminum
Inconel clad copper
Aluminized steel
Wrought nickel
Low carbon steel
Inconel clad nickel
Stainless clad steel
Type 430 stainless
Stainless 302,321,347
S-816
Std. inconel and Inconel B
Inconel X
0 100 200 300 400 500 600 700 800 900 1000
Temperature, °C

FIG. 3—Thermal conductivity of sheet materials.

1200 and 1650°F varies with the installation. If there is a misalignment with connecting lines from the engine manifold, the nozzlebox may be subjected to high alternating loads. The sheet metal portion was made of type 316 stainless with successful operation and this material selection was based upon its better high temperature strength as compared to other common stainless materials. However, since the nozzlebox operates in a sensitizing temperature range for austenitic stainless, this material was sensitized to intergranular corrosion, and in some instances failed. Since a change was made to type 347 stainless, little difficulty has been encountered with nozzleboxes. A photograph of a portion of a nozzlebox, shown in Fig. 5, and a photomicrograph taken at 100X, demonstrates the type of intergranular corrosion which led to the conversion from type 316 stainless to type 347 of heavier section.

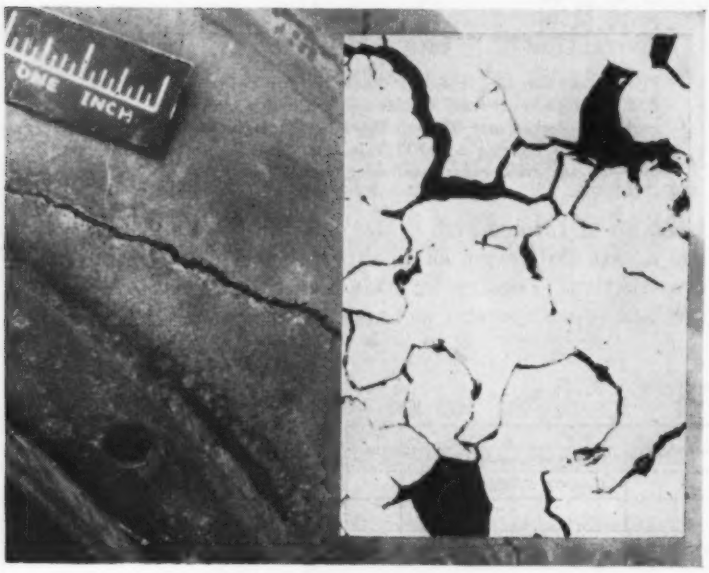


FIG. 5—Section of Turbo Nozzlebox, Type 316 Stainless. Failure occurred through intergranular corrosion a micrograph of which appears in the insert, unetched, 100X.

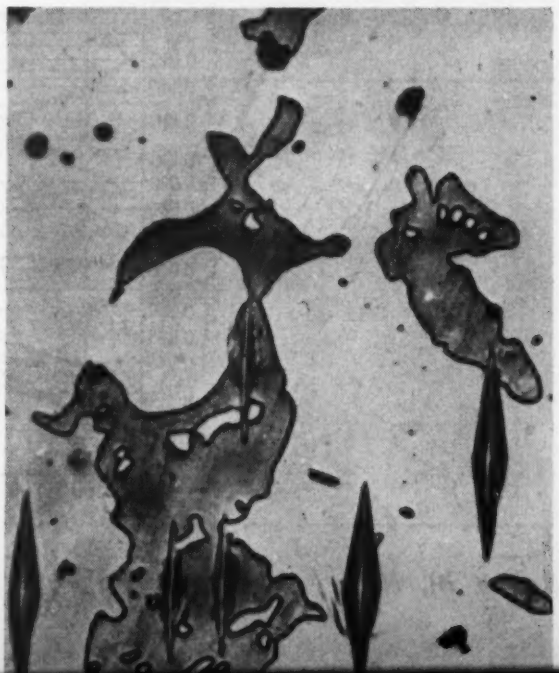
The turbo nozzle diaphragm is subjected to the same general conditions of temperature and stress as the rest of the nozzlebox. However, the nozzle partitions in the diaphragm are subject to somewhat more severe stresses than some other parts of this assembly, because of the variable metal sections. Also the partitions are directly in the path of the hot gases, and are generally of such dimensions that they must be of solid section, they cannot benefit from the advantages of cooling air. Some early diaphragms were fabricated, and the thermal stresses normally present caused considerable trouble.

As a 25Cr-20Ni sand casting the diaphragm has given almost flawless service. Recently, a single cast diaphragm failure was encountered which appears to be associated with sigma phase formation, and higher than normal stresses. Typical sigma phase is shown in Fig. 6. The chemical composition of this diaphragm included very low carbon, 0.05 pct, with an otherwise average composition. This lower carbon contributed to the ferrite forming tendency, and in conjunction with the operating temperature, undoubtedly resulted in the formation of the sigma phase. The regular carbon level is approximately 0.15 pct and the presence of sigma has not been observed in standard material.

Turbo-supercharger of jet engine turbine wheel failures due to temperature effects have not occurred. Wheel failures have been associated with forging cracks, or poor wheel center conditions, particularly in large sizes. Forgings may contain internal flaws or poor ductility, which are difficult to locate without destroying the wheel, although X-ray and supersonic methods have been extremely helpful in preventing test or field failure in engine operation. This problem has been largely overcome by several approaches; chiefly through the production of sound ingots, by a continuous melting process, improved forging practice, and by the use of a composite wheel, where the high temperature austenitic alloy (16-25-6 Timken alloy) is used at the rim only, and the hub section is made of a ferritic heat treatable alloy, AISI-4340. These two parts are welded together by arc welding. Because of the extremely successful operation of a composite wheel, the trend is to increase the diameter of the ferritic material at the center and at the same time reduce rim width. This allows a less expensive assembly, both from a dollar and cents standpoint and strategic alloy content.

The temperature of the turbine wheel is a

FIG. 6—Sigma phase in a 25-20 turbo diaphragm. Dark areas are sigma and have a 720 Knopp hardness. Austenite, white areas, have a hardness of 307 Knopp. Etched with alkaline ferricyanide, 1000X.



fairly uniform gradient from approximately 1200°F at the rim, to 400°F at the center. The limiting factor here is the creep strength, since clearance of the stationary shroud and the buckets is held as close as possible for best turbine efficiency, and rubbing of the shroud and buckets is undesirable. Short-time room temperature yield strength is important. Some alloys, strong in creep and rupture at designed temperature are not usable because of poor center ductility and yield strength at low temperatures.

Turbo- supercharger and jet engine turbine buckets operate at a temperature between 1200°F and 1500°F, and fail by either stress-rupture or fatigue. Whether or not the failures are due to stress-rupture or fatigue is often controversial. The assigned cause of failures, for the most part has been stress rupture in the case of small buckets for turbo-superchargers. Turbo buckets are very short and have a shroud as part of the bucket design. The jet engine turbine bucket, with a few exceptions, has been of the shroudless design, and the failures recorded on these shroudless buckets have been, generally, of the fatigue type. The few turbine buckets with the shrouds have failed by stress-rupture. Many of these stress-rupture failures may have been associated with thermal shock.

Shroudless gas turbine buckets have failed in a high percentage of the cases in the same location and can be associated with a Chladni vibration and pattern at extremely high frequencies.

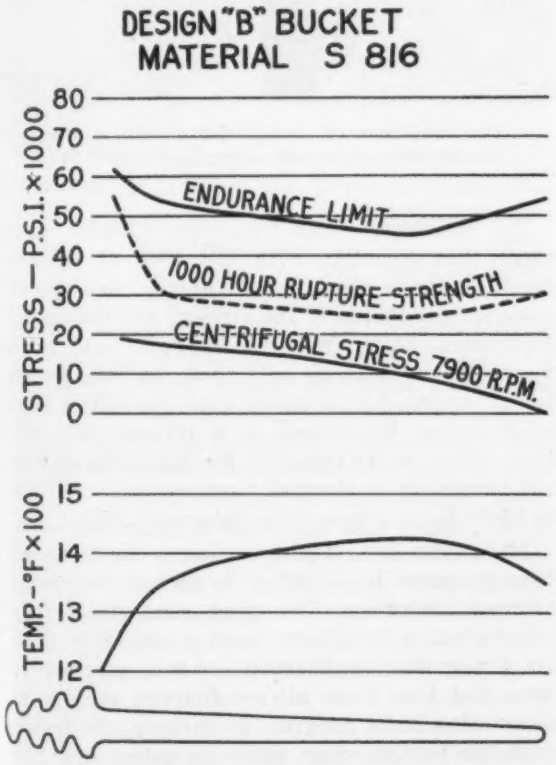


FIG. 7—Average stress and temperature distribution in gas turbine bucket, also available 1000 hr. stress-rupture strength and endurance limit at various temperatures along bucket when the bucket material is S-816 alloy.

The points of failure have been indicated to be an area of probable high stress. These patterns, however, have all been made at room temperature and the exact effect of operating temperature on these patterns is unknown. They are undoubtedly changed since the modulus of elasticity lowers with an increase in temperature.

Fatigue Causes Failures

Failures of three shroudless gas turbine buckets design A, design B, and design C have been chiefly due to fatigue as indicated by the metallurgical investigations. In the case of the design A, it was a bucket made from cast Vitallium and alloy well adapted to casting by the lost wax process. The design B bucket, in which failures have been of a fatigue nature with a few exceptions, is made from forged S-816 Alloy, a complicated composition of C, Cr, Ni, Co, W, Cb, and Mo. Design C is a smaller shroudless bucket made from forged Hastelloy B, a nickel-moly alloy.

As an example of stress and temperature distribution, Fig. 7 exhibits the average centrifugal stress at the various locations in the blade of the design B buckets based on the designers calculations. In addition, it shows the operating temperature, the available 1000 hour stress-rupture strength, and the 10^8 cycles endurance limit at the various temperatures of the bucket. By operating a bucket of Inconel X, for a known period of time; and correlating the hardness of the Inconel X bucket with age hardening curves for this material as affected by time and temperature, the distribution of temperature during operating was determined. Bucket temperatures have been checked by the use of hardened high speed steel pins placed in drilled holes in the bucket. By determining the change in hardness of the pins after several hours of operation the operating temperature of the bucket is confirmed.

Failures Are Incipient

There is considerable margin between the stress available and that indicated by the average centrifugal stress. The majority of failures of the design B bucket have been at a point ¾ in. below the tip on the exit edge. Cracks have also been found approximately ½ in. in from the exit edge near the pitch line and at a similar point from the edge at the tip of the blade. These failures were generally of incipient nature and of a type which appeared to start on the inside of the bucket blade and progressed to the back. In several cases, particularly those near the pitch line and ½ in. in from edge, the cracks did not progress all the way through to the back side. Failures of this type occurred not only in S-816 but also in cast Vitallium buckets of design B, which were also tested.

Failure points on the design A cast Vitallium buckets has been, in many cases at a point approximately 2½ in. above the base on the exit

edge. The conclusion on these failures has been that they also are fatigue and related to some resonant excitation, possibly 8000 cycles per second, which was a predictable excitation in this particular application.

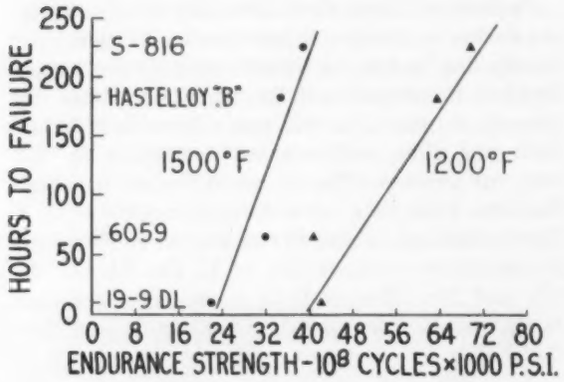


FIG. 8—Engine tests on design C buckets show relative endurance strength.

A number of different materials were run in engine tests on design C buckets. Plotting the results of a series of these tests, Fig. 8, a relation appears to exist between the fatigue strength at 1200°F and 1500°F and the hours to failure in the test cell. Such a good relationship cannot be drawn on either the design A or B.

The small turbo-supercharger buckets have given a fairly good relation between laboratory stress-rupture strength and hours to failure in the supercharger. As the stress-rupture strength increases, the performance life of a turbo bucket also increases.

The metallographic analysis of these failures to determine whether or not they were of a stress-rupture or fatigue type has been based upon whether or not the fracture was intergranular or transgranular. The former has been taken to be indicative of a stress-rupture failure and the latter has been thought to be fatigue. With reservations this assumption is believed to be sound for S-816 and also Vitallium for the temperatures and times which are normally encountered. Longer time and high temperatures could well cause both the stress-rupture failure and fatigue failure to be intergranular. Whether the fracture is intergranular or transgranular is dependent upon the strain rate and temperature.

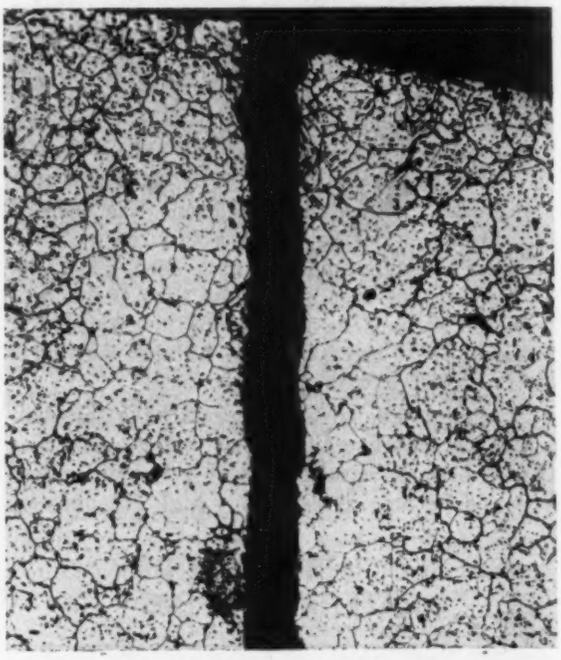


FIG. 9—Design B bucket—S-816 Alloy—100X Transgranular crack—exit edge ¾ in. from tip.

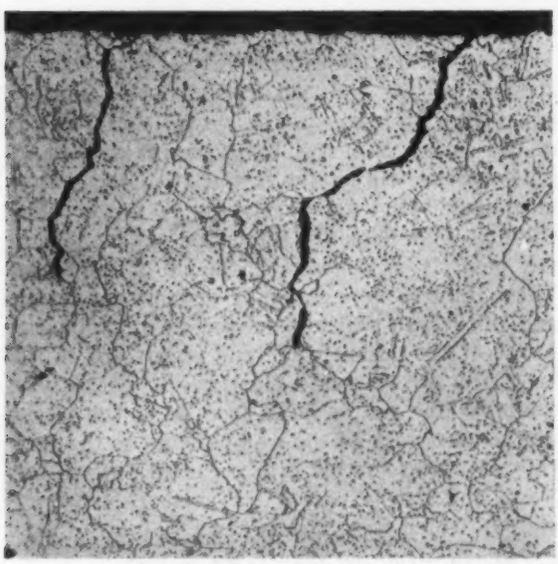


FIG. 10—Design D bucket—S-816 Alloy—100X Intergranular cracks—inlet edge.

The extremely high frequency Chladni patterns that correlate with the zone of failure would indicate that failure occurs fast under resonant conditions if the stresses are above the endurance limit. The time interval could be a matter of minutes or only three or four hours for 10^7 cycles. The accepted endurance limit that could better be defined as a fatigue strength since alloys so far tested do not appear to flatten out completely at elevated temperatures (1200°F to 1500°F) to give a true endurance limit.

Metallographic specimens have, in general, been prepared in an effort to include the point of crack nucleation. The exact point where failure started is sometimes hard to establish. The crack may start by thermal shock or stress-rupture, and then since all designs are subject to alternating loads, progress by fatigue, the transgranular portion may again be taken over by stress rupture because of the reduced cross-section and increased load. Fig. 9 is a typical transgranular crack while Fig. 10 shows an intergranular crack in the same material.

Ductile Iron —in Light Sections

Very light-sectioned castings can be produced in ductile iron. The material has been used with excellent results in large production runs of castings weighing as little as 1/3 oz with sections as thin as 3/32 in. Experimentation resulted in selection of an ideal annealing cycle for producing maximum ductility.

By E. J. LAUFER
Foundry Superintendent,
Acme Shear Co., Bridgeport, Conn.

DURING the past year, engineers and foundrymen have shown great interest in the properties, applications and production of ductile iron. Most of the literature deals with the engineering properties of test specimens or medium to heavy-sectioned castings. Of equal interest is the production and usage of light-sectioned ductile iron castings.

After International Nickel Co., Inc., publicized development of ductile iron,[1] Acme Shear Co., Bridgeport, Conn., became interested in this new material. It was hoped that, by using such magnesium-containing cast irons, the malleable iron foundry could be eliminated and all castings produced in the gray iron shop. This has been done.

At the outset, it was clear that production of light-sectioned ductile iron castings might be difficult to control. Through extensive development work, however, these production difficulties have been surmounted.

Much remains yet to be done, but daily production of about 5 tons of castings varying in weight from 1/3 oz to over 40 lb indicates that ductile iron castings can be regularly produced with sections varying from 3/32 to 1 in. The dependability of the process is indicated by the fact that well over 1½ million individual castings have been sold, and at least as many are on order at the present time. Several castings have been produced in lots of over 100,000 pieces.

An example of one of the first large repeat orders is shown in Fig. 1. These "C" clamps, which have been thoroughly tested by the manufacturer, vary from 1 to 6 in. in size. The sections vary from ⅛ to ¼ in. in thickness. Comparison of identical sizes in the photograph shows that the yoke of an annealed casting can readily be bent 90° without failure. Some castings will withstand a 180° twist, and some, when finally cracking on the inside, will tear longitudinally. Such ductility is sufficient for this use.

As for strength, the test figures listed in Table I illustrate a yield strength at least 50 pct greater than that of either forged machinery steel or the former material, which was malleable iron. Another manufacturer of "C" clamps presents the data shown in Fig. 2 for comparing ductile iron with a high strength processed gray iron and a cast aluminum alloy. The ductile iron clamp has a marked advantage in this case of resisting breakage when the clamp is dropped or struck a hammer blow.

Fig. 3 illustrates electrical hardware fittings made of ductile iron, produced in lots of hundreds of thousands. The average weight of these castings is less than 2 oz each, and the sections

vary from less than 3/32 in. to about ¼ in. The distortion which these castings can withstand is readily seen by comparing similar pieces.

Toughness Proven

Further proof of the toughness of these very light-sectioned castings is shown in Fig. 4. This is an enlarged view of a finished fitting. The holes in these castings were punched, not drilled. The two side holes are ⅛ in. diam through a

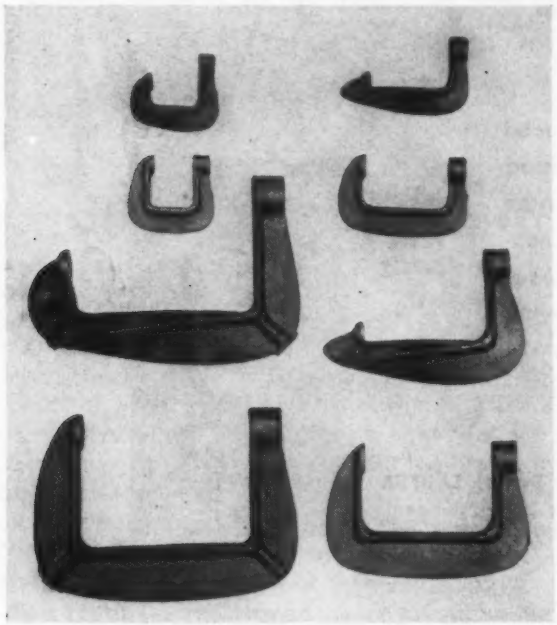
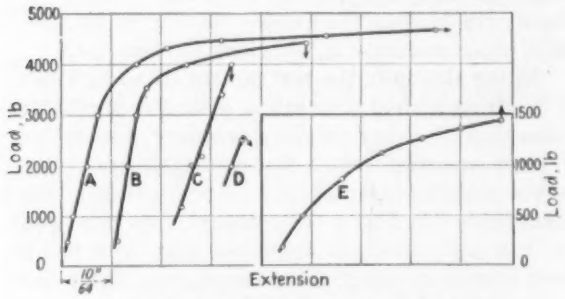


FIG. 1—The top piece in each size group of these ductile iron "C" clamps has been twisted 90° to demonstrate exceptional ductility.

3/32 in. wall; end holes are 3/16 in. diam through a 1/16 in. wall. The ready machinability of annealed ductile iron is also illustrated by the clean-cut threads on these cadmium-plated pieces.

Perhaps it would be interesting to note briefly some of the industries in which ductile iron



A—6 in. Ductile Iron; did not break at 4650 lb.
B—3 in. Ductile Iron; broke at 4400 lb.
C—6 in. High Strength Cast Iron; broke at 4000 lb.
D—3 in. High Strength Cast Iron; broke at 2570 lb.
E—4 in. Cast Aluminum Alloy; broke at 1720 lb.

FIG. 2—Comparison showing strength and ductility of ductile iron, high strength processed gray iron and a cast aluminum alloy.

TABLE I

YIELD STRENGTH TESTS

Ductile Iron Compared With Other Materials*

Material	Total Load to Yield, lb
Ductile Iron	1508
Malleable Iron	984
Forged Machinery Steel, SAE 1010	984

* Tests on 2-in. "C" clamps.

castings have been adopted or are on trial. Typical applications are found in the small tool, electrical supply, harness hardware, household appliance, gage, valve, shotgun and rifle, name plate, aircraft, shoe machine, and machine tool industries.

Most of the light castings are furnished in the annealed condition where they have maximum ductility, toughness, and machinability. Acme Shear also produces a high strength, high elastic modulus, good metal-to-metal wearing grade in

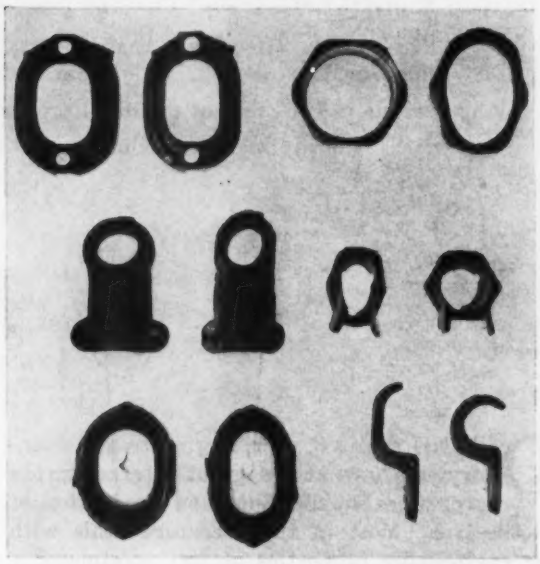


FIG. 3—Electrical hardware fittings made of ductile iron, averaging less than 2 oz each in weight and having sections carying from 3/32 to ¼ in.

the as-cast condition for castings with over ½ in. min section. Typical properties in 1-in. keel block test bars for these two grades are listed in Table II. A typical analysis of the iron is: 3.52 TC, 2.39 Si, 0.24 Mn, 0.077 P, 0.017 S, 1.5 Ni, and 0.090 Mg. Microstructures of the material in the annealed and as-cast conditions are shown in Figs. 6 and 7.

Gates must be designed especially for ductile iron castings. With a few exceptions, it was found possible to produce acceptable castings by regating. Most of the work is mounted on matchplates, and most of the original gating was in accordance with good malleable iron practice. In almost every case, the gates and risers were redesigned for ductile iron.

Sands have presented no problem. A fine, synthetic green sand, designed for gray iron castings, is used. This sand is bonded with a car-

TABLE II
PROPERTIES OF DUCTILE IRON TESTS BARS*

Property	Annealed	As-Cast
Yield point, psi**	54,050	81,650
Tensile strength, psi, ultimate	71,900	98,200
Elongation, pct in 2 in.	19.0	2.5
Reduction of area, pct	24.5	2.0
Hardness, Bhn	170	269

* 1-in. keel block test bars.
** 0.005 in. extension under load.

bonaceous resin and southern bentonite. Typical properties of the sand are: Green strength, 12 lb; permeability, 20; and moisture, 4 to 4.5 pct.

Not Ductile as Cast

Thin-walled magnesium-containing iron castings seldom have any ductility in the as-cast condition. This is because the high mold cooling rate produces a matrix structure of very fine pearlite, with possibly some excess carbides. An annealing treatment is therefore required to develop high ductility in these thin-walled castings. Experimentation with various annealing cycles has shown the cycle in Table III to be convenient and adequate. Castings are packed in heat resistant alloy annealing boxes, which are stacked two-high in pyrometer-controlled, oil-fired annealing furnaces. Packing is not necessary unless distortion is a factor, as the castings are not at an elevated temperature long enough to oxidize or decarburize deeply.

It will be noted that the annealing cycle is completed within 24 hr in the furnace as compared to a normal 90-hr cycle for ordinary malleable iron. This is a big advantage in production, for castings which are poured today may be shipped the day after tomorrow. In emergencies,

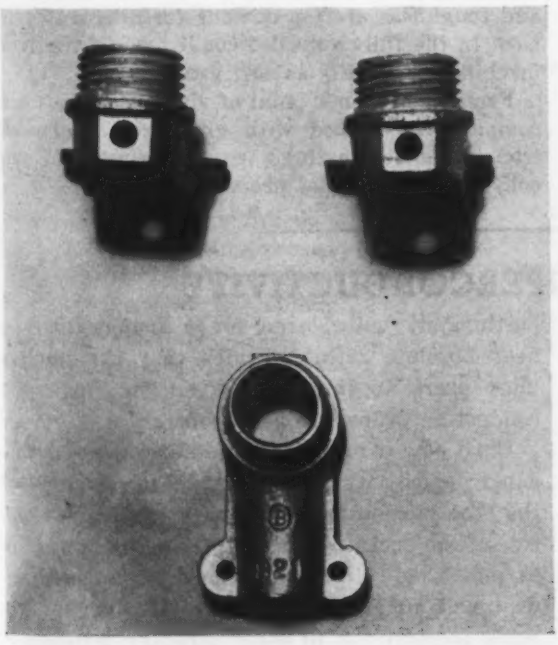


FIG. 4—Enlarged view of a punched and machined fitting, further demonstrating the toughness of ductile iron.

TABLE III
ANNEALING CYCLE FOR DUCTILE IRON

Operation	Temp, °F	Hours
Heat to	1600	in 6
Hold at	1600	8
Furnace cool to	1300	in 8
Box cool	....	2
Shake out and cool	....	....

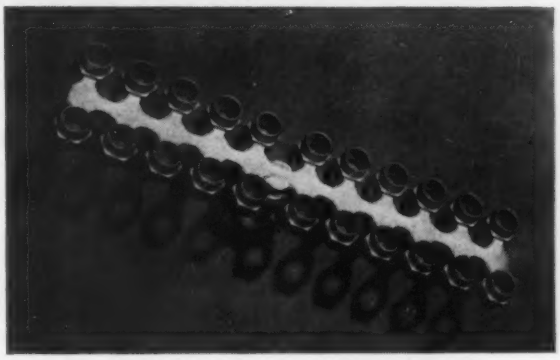


FIG. 5—Multiple casting of electrical fittings produced in ductile iron. More than 100,000 of these parts were produced wtih satisfactory results.

the heat treatment may be considerably shortened by heating the castings unpacked in open furnaces.

The surface of ductile iron castings is in general smoother than that of identical gray iron castings. Pattern reproduction is excellent and

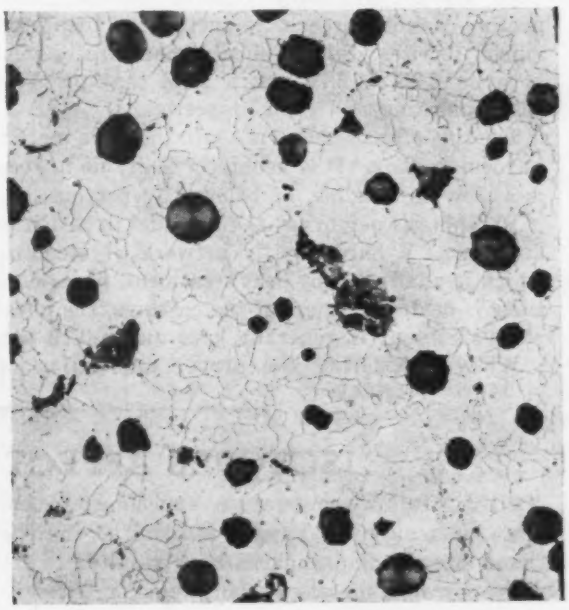


FIG. 6—Photomicrograph of annealed ductile iron, showing graphite spheroids in a ferritic matrix, with a few traces of pearlite in the areas furthest removed from the graphite. Etchant, 1 pct nital. 100x.

it is possible to cast quite-thin edges with sharp corners. Ductile iron castings seem to have less tendency to burn in, and when shaken out the sand peels cleanly.

Unless proper precautions are taken, shrink-

age can be a problem in this metal. A fractured surface shows up shrinkage in ductile iron as a dark spot against the normal light crystalline background. Such porosity would pass entirely unnoticed against the darker fracture of gray iron, and is frequently present. Often the shrinkage occurs as external pulls and draws on the surface of the casting, but this is not always true.

The patternmaker's shrinkage for ductile iron has several values. Castings inoculated to produce a pearlitic structure have a shrinkage about the same as that of gray iron, or about ⅛ in. per ft. The same casting grows slightly when annealed; an overall shrinkage allowance of 1/16 in. per ft was found to be sufficient.

The metallurgy of magnesium-containing cast iron is novel. In the past, foundrymen have had to maintain careful control of the carbon content in gray and malleable iron. In ductile iron, however, this element seems to have little effect on the properties over a nominal range of about 0.50 pct, and is generally kept within the range of 3.3 to 3.8 pct to get high fluidity in the iron.

Silicon is unimportant, insofar as graphite control is concerned, but acts as a true alloying element in the matrix with potent influence on the physical properties. Since silicon is a ferrite strengthener, high silicon contents produce irons with high yield strengths, but at levels greater than 3.0 pct gradually reduces ductility. Annealing cannot increase the ductility of such high silicon ferrites. Silicon should therefore be held between 2.25 to 2.75 pct, a level that provides easy annealing and good properties.

The role of manganese is again that of a matrix hardening alloy. It is generally desirable to keep it as low as possible, or below 0.30 pct max.

Phosphorus performs its role usual to cast iron and forms a hard, brittle network of steadite, which is unaffected by heat treatment. Since ductility is desired in most of the castings, the phosphorus content is generally kept under 0.10 pct.

When considering the proper application of ductile iron, it seems well to bear in mind that this material has a unique combination of engineering properties attractive to the consumer. For instance, ductile, iron is superior to malleable iron in physical properties. Ductile iron has a minimum of 50,000 psi yield strength as compared to 32,500 for ordinary malleable iron. Annealed castings of ductile iron will have a minimum of 15 pct elongation in well-fed test bars. Ordinary malleable iron has 10 pct min.

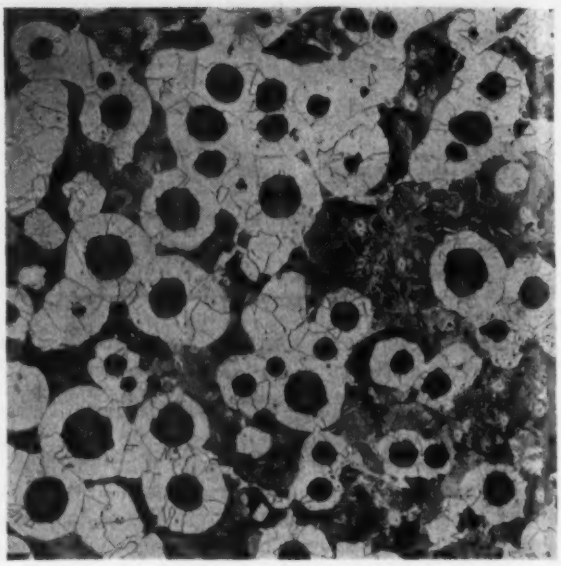


FIG. 7—Microstructure of ductile iron in the as-cast condition, showing graphite spheroids surrounded by ferrite rings in a matrix of fine pearlite. Etchant, 1 pct nital. 100x.

Thus, ductile iron has a higher yield at equivalent ductility when annealed. This relationship holds true even for the pearlitic malleable up to 60,000 psi yield strength. The advantages of ductile iron over gray iron with regard to strength, ductility and toughness are too obvious for detailed mention. In the fully annealed condition, ductile iron machines as readily as soft gray iron.

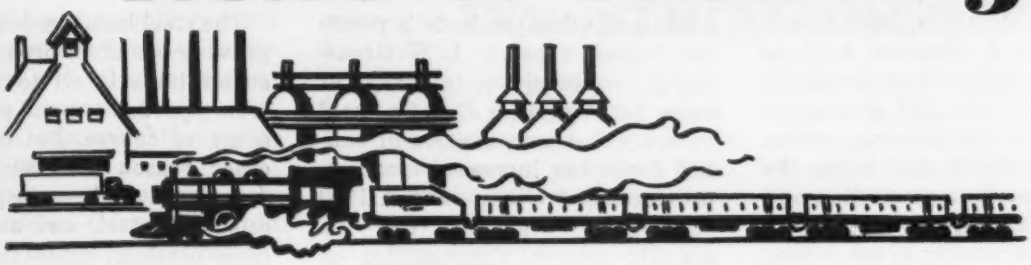
From an economic point of view, ductile iron is competitively priced with gray iron, malleable iron and steel castings, particularly when one considers its unusual properties.

ISOTOPES AFFECT SUPERCONDUCTIVITY

RECENT low-temperature experiments conducted by Dr. Emanel Maxwell of the National Bureau of Standards have resulted in the discovery of a new and wholly unexpected relationship between superconductivity, the loss of electrical resistance at very low temperatures, and the constitution of the atomic nucleus. It was found that the pure mercury isotope 198 becomes superconducting at a temeprature about 0.02° K higher than does natural mercury, which is a mixture of five different isotopes having an average atomic weight of 200.6. As the difference between the isotopes depends entirely on their nuclear masses, this shift, which is proportionately quite large for a temperature so near absolute zero, indicates that the nucleus must exert an important effect on the superconducting properties of the metal.

Until now it has been generally supposed that superconductivity is concerned exclusively with the properties of the electronic configuration outside of the nucleus. However, the results obtained at the Bureau, in combination with an independent and almost simultaneous discovery of the same phenomenon in other mercury isotopes at Rutgers University, establish the validity of the nuclear effect beyond question.

News of Industry



Flat-Rolled Output Rises 80 Pct in Decade

Average American's use up 62 pct, population rises 13.6 pct . . . Steel ships 80 pct more, pushes up production . . . Detroit big user and war orders coming—*By John Delaney.*

Pittsburgh—The average American is consuming 62 pct more flat-rolled steel today than he was in 1940, and the steel industry, trying desperately to keep pace, has increased its shipments of these products by 80 pct and is stepping up production even further.

A survey by THE IRON AGE (Jan. 5, 1950, p. 163) showed that in 1948-49, at least 25 steel producers installed new equipment or modernized existing installations for the rolling of steel, chiefly flat-rolled. Rolling mill builders are still trying to catch up with heavy order backlogs.

Increase of 80 Pct

During the first quarter of 1950, the steel industry shipped hot and cold-rolled sheets and strip, galvanized sheets, enameling sheets, electrical sheets, blackplate, and tin and terneplate at the annual rate of approximately 27,600,000 tons—an increase of 80 pct over 1940 shipments of 15,306,000 tons. Consumers are gobbling this up and clamoring for more.

Per capita consumption of sheet steel by 132 million Americans in 1940 was 227 lbs. Today, per capita consumption by 150 million Americans is 368 lbs—a 62 pct increase on top of a 13.6 pct increase in population.

This phenomenal increase in demand for products made of steel is one reason why the industry is having such a difficult time satisfying demand. Superimpose on this an inevitable increase in military requirements and the result is a great big headache.

The growth in demand for flat-rolled products reflects: (1) An expanding economy, (2) technological advances in the production and fabrication of flat-rolled steel, (3) new markets, and (4) adaptability to mass-production techniques. In short, the producers and fabricators have for the most part created this growth by bringing steel products within reach of more consumers.

CHANGES IN PRODUCT DISTRIBUTION

Jones & Laughlin Steel Corp.

	1949	1948	1939	1935
Hot-Rolled and Cold-Rolled Sheet and Strip	40	37	22	1
Tubular Products	20	17	18	15
Tin Mill Products	8	9	7	8
Wire Products	5	5	7	8
Hot Rolled and Cold Finished Bars	16	18	21	24
Plates and Structural Shapes	8	10	7	16
Miscellaneous	3	4	18	28
Total	100	100	100	100

Detroit Takes 35.4 Pct

The automotive industry is by far the heaviest consumer of the flat-rolled products mentioned above. In the first quarter of 1950, this industry was shipped 2,355,474 tons of a total of 6,909,764, or 35.4 pct. Since then automobile producers have stepped up production schedules, and their consumption of steel has gone up in proportion.

This growing demand has brought significant changes in the product mix of the steel producers. Some were slower than others in detecting the trend, but everybody's aboard the bandwagon now. The reasons: (1) Flat-rolled items are money-makers, have been carrying the load for other not-so-profitable products. At least that was the case for years. Steel producers have a better idea of what their costs are today, however, and are endeavoring to price all products more realistically. (2) Flat-rolled for the most part goes into consumer goods, and demand does not fluctuate as sharply due to the greater variety of end products made from it.

Cart Before Horse

This latter point was the reason given by Jones & Laughlin Steel Corp. for its shift of emphasis from such "heavy" items as plates and structural shapes to sheets, strip and tubular products. The table at left tells the story.

This is putting the cart before the horse, however. Something had to happen to stimulate demand. That "something" was the advent of the continuous rolling mill which made it possible to turn out flat-rolled steel of better quality faster, cheaper and in greater quantities. The slow, clumsy hand mills have all but disappeared. The handful still in operation are economic only for production of

specialized items in small quantities, or in a situation such as exists today, when every available facility is in use and consumers are willing to pay premium prices.

The continuous mill broke the twin bottleneck of production and price. This, plus constant improvement of quality by producers, and better fabricating techniques by consumers, made more people want to use more flat-rolled. Where formerly a casting was used, it was now desirable to use sheet steel or strip. It replaced other materials—for example, wood in railroad car building. Even today, architects are becoming aware of the advantages of stainless steel sheets over wood, brick and mortar in building construction.

More Cans Used

New outlets are constantly opening up, and others are expanding. Television, for example, is consuming heavy tonnages of stainless and electrical flat-rolled. With ever-increasing use of electricity and gas in the home, demand for refrigerators, stoves, washers, driers, and other appliances using sheets and strip seems almost limitless. The growing emphasis on sanitation and extension and improvement of sewage facilities has resulted in increased use of bathtubs and other toilet facilities made of steel. Steel kitchens are becoming commonplace.

Use of tinplate for canning foods and other products is pressing tinplate capacity. L. W. Graaskamp, vice-president in charge of sales for American Can Co., said recently that consumption of canned foods has increased from approximately 2 billion cans in 1900 to about 20 billion last year — a ten-fold growth. Consumption of cans for non-food products was close to 10 billion in 1949. Thus, the average American family opened about 750 cans last year.

The steel industry feels that this growing use of its products in consumer lines is all to the good—from a production and profit standpoint, of course. But there is another reason just as important. Americans are becoming more conscious of steel, and are learning from personal contact the importance of this great industry to their everyday activities. That is what the industry wants and what it has been seeking.

Behind-Schedule Ore Shippers Race with Time

Weather will determine if tonnage can be brought down successfully . . . All-Lake movement of 75 million tons not likely . . . To ship ore into December—*By Bill Lloyd.*

Cleveland—With steel demand at a new high, iron ore shippers, sour-weathered into a month-late start last spring, are racing against time to bring down 75 million tons of iron ore this season.

Only the optimists believe that a 75 million ton all-Lake movement is still a possibility. Major factors in the success or failure to get the tonnage down will be the weather.

Earlier, iron ore shippers' goal was a total movement this season of 81 million tons, now considered impossible.

Stocks on hand July 1 at furnace yards and Lake Erie docks totaled about 19 million tons. Another 1.5 million tons was in transit. Another 3 million tons will probably move all-rail from July 1 to March 30, 1951.

Lake shippers hope to load ore through November and into December, weather permitting. At the present rate of movement, about 2.8 million tons a week, the iron ore fleet from July 1 has about 16 or 17 weeks to operate at this rate, to ship a maximum of 44.8 million tons by Nov. 1.

In addition, there should be about 3 weeks in November, according to one iron ore authority, when the fleet could move an estimated 2.2 million tons and another 3 weeks (or until the third week in December) at 1.5 million tons a week, making a total of about 56 million tons.

Stocks Will Be Lower

This tonnage, plus stocks on hand, in transit, and all-rail tonnage, totals about 79 million tons which should be availabe for the period from July 1 to April 1, 1951.

Assuming consumption continues at the present rate, stocks on hand April 1, 1951, should total about 14.9 million tons. On April 1 this year, stocks totaled about 20 million tons and 14 million tons on May 1.

Two big steps to augment the iron ore movement have been

VERSATILE PRESSES: Hydraulic Press Mfg. Co. 300-ton and 500-ton presses are kept busy at the John Deere Tractor Works, Dubuque, Iowa, running over 52 different parts such as grills, fenders, oil pans, etc. A record 96 operations, notching, blanking, forming, drawing, trimming, etc. are involved, many of them combined in dual or progressive die sequence.

taken. The Canadian bulk carriers will carry ore between U. S. ports as a result of the legislation passed and signed by Mr. Truman on June 30, amending the coastwise shipping laws.

The all-rail movement will help out. U. S. Steel Corp. is moving tonnage all-rail from the Mesabi into certain consuming districts, including Pittsburgh and Youngstown.

Pooling Plan

Should the industry be short in some spots, a pooling of raw material stocks, similar to that which took place in latter part of April, 1950, may be called for.

The late opening and strikes cost the movement an estimated 7.5 million tons of iron ore. Consequences of the Great Northern strike are not measurable entirely, however, by the tonnage cost during the strike.

Manganese from Brazil

Rio de Janeiro — Expectations here are that America, barred from Russian manganese, will seek to broaden its sources by obtaining shipments from Brazil, owner of the largest deposits on this side of the Atlantic. Brazilian manganese shipments have been curtailed by absence of modern mining machinery and transportation.

Scrap Imports Increase

New York — Foreign purchases of high-quality scrap have been increased to 400,000 to 500,000 tons according to Robert W. Wolcott, chairman of the Committee on Iron and Steel Scrap of the American Iron and Steel Institute. Export licenses have been granted on this scrap and it is to be delivered over the rest of the year, stated Mr. Wolcott.

To Open GE Electronics Office

Birmingham—The General Electric Co. electronics department will open an office in the Brown-Marx Building here this week. John Klenke has been appointed Birmingham district manager.

INDUSTRIAL SHORTS

FORD BUILDING — The Lincoln-Mercury Div. of FORD MOTOR CO. plans to build a new assembly plant on a 179-acre site west of Wayne, Mich. The new factory will have a production capacity of 640 cars per day and will employ more than 3000 persons.

MORE PLASTIC PIPE—A new plant in Corsicana, Tex., has been acquired by the CARTER PRODUCTS CORP., Cleveland, for the production of Carlon flexible plastic pipe. The plant is scheduled to start operations within the next 30 days.

BUYS ENGINE LINE—The engine division of the Atlas Imperial Diesel Engine Co., Oakland, Calif., has been purchased by the NATIONAL SUPPLY CO., Pittsburgh, Pa. Production of Atlas engines and service parts will be transferred to National's Springfield, Ohio, plant as rapidly as possible.

SEEKS EXTENSION—UNITED GAS PIPE LINE CO. is seeking permission to add 1130 miles of transmission line to its system in Texas, Louisiana and Mississippi. Estimated to cost $112 million, plans involve 800 miles of 30-in. line and varying mileages of other sizes from 8 to 26 in. pipe.

NEW METHOD—A method for applying a seamless sheathing of aluminum to telephone and electric power cables has been developed by ALUMINUM CO. OF AMERICA, Pittsburgh. This new method, for which patent application has been made, involves the principle of cold reduction or swaging, as by a tube reducer.

WIRE ROPES—John A. Roebling's Sons Co., Trenton, N. J., has appointed A. B. MURRAY CO., INC., Elizabeth, N. J., as their agent for blue center wire rope, wire rope slings and wire rope fittings.

ACQUIRES RAMCO—The Ramsey Corp., St. Louis, makers of pistons rings, has been purchased by **THOMPSON PRODUCTS, INC.**, Cleveland, producers of valves and other automotive parts. The corporation becomes a subsidiary of Thompson with J. H. Coolidge, Thompson vice-president and treasurer, as president and J. A. Ramsay, vice-president and general manager.

EXPANDING — Immediate additions totaling $500,000 to the plant and equipment of the MONARCH MACHINE TOOL CO., Sidney, Ohio, have been approved. The program involves the replacement of about 30,000 sq ft of old plant structure with new, plus the construction of 12,000 sq ft of additional plant area.

NEW OWNERSHIP—Announcement has been made by the PORCELAIN METAL PRODUCTS CO., Carnegie, Pa., that they are now under new ownership. T. O. Warfield is president; J. R. Sweeny, vice-president charge of sales; A. F. Petan, vice-president charge of production; and E. J. Ranz, treasurer.

FUNDS FOR MINE — Some $3.6 million in Marshall Plan funds will be contributed to the $16 million improvement project in the works for the ZELLIDJA lead and zinc mine at Bou-Beker in French Morocco.

MOVES—The sales and advertising offices of the MIDWAY TOOL CO., INC., have been moved from Cleveland to the company's factory at Melvin, Ohio.

LARGER QUARTERS — HYPRO TOOL CO., manufacturers of taps, slotting saws, allied metal cutting tools, insert bits and holders, is now completely established in its new plant at New Bedford, Mass., double the size of its former quarters.

Armco Rolls 0.00015 in. Thick Steel for Electronics Equipment

Need for thinner steel with quicker magnetic saturation prompts project

Middletown, Ohio — Super-thin gage electrical steel has been rolled to a thickness of 0.00015 in. on a diminutive experimental mill made by Armco Steel Corp. to fulfill the needs of high frequency electronic equipment manufacturers. Tiny work rolls 5/16 in. in diam, supporting tens of thousands of pounds of pressure, roll out steel ten times as thin as a human hair, six times as thin as cigarette paper.

LILLIPUTIAN COILS: Armco's super-thin gage electrical steel is cut into strips and coiled on tiny spools.

Need Thinner Steel

With the development of high frequency electronic equipment, steel with split second magnetization characteristics to reach maximum magnetic saturation in the shortest possible time was needed. The thinner the steel, the quicker this happened.

The task of producing a super-thin magnetic steel not more than 0.00025 in. or 250 millionths of an in. thick was given to Armco by Navy officials and manufacturers. Armco technicians designed a laboratory-scale mill but wondered if manufacture of steel so thin was practical. In 5 weeks the mill was rolling.

Overcome were problems of designing supporting rolls for terrific rolling pressures, shaping them, and selecting bearings. An entirely new tension device to maintain correct tension during rolling was designed. The slightest variation in tension when making steel this thin could tear the strip and ruin the run.

The alloy to be rolled on the tiny mill is first reduced on a larger mill to between .006 and .002 in. Then the 12-in. wide product is cut into 2-in. strips and run through successive passes to be elongated about 400 times and reduced. For performance testing, the steel is slit into ribbons by a razor blade jig. The 1/10-in. wide ribbons are coated, coiled, and annealed.

Manufacturers have thus far been supplied with magnetic alloys of high nickel content and 3 pct silicon iron rolled to the required 0.00025 in. thickness. They are now testing the experimental batches. Armco indicates that the super-thin steel can be rolled on a production mill basis.

Meanwhile Armco shipped out one order by first class mail—in an aspirin box.

Midwest Buyers Balk at Foreign Steel Prices

Few consider more orders . . . Prices up . . . Mills pretty well booked . . . Cream gone . . . Fear controls . . . Group imports 30,000 tons . . . Sell foreign sheets—*By Gene Beaudet.*

Chicago — Buyers of foreign steel in the Midwest are generally backing away from what looked like a good thing last April and May. At that time they could buy foreign steel delivered in Chicago at little over mill prices. They in turn could sell it directly to consumers, warehouses or other dealers and distributors. A lot of it ended up on the gray market.

A check of steel distributors and dealers reveals that few of them are considering placing further orders with foreign producers. The prices have gone up and the cream has been taken off. Also, European mills are pretty well booked up for the rest of the year and some promised deliveries are not coming through. In some cases the steel does not meet specifications and is rejected by consumers.

Encounter Difficulties

Many small distributors have difficulty getting letters of credit necessary for doing business of this kind. Others feel that price controls will be put on and they will be left with a stock of high priced steel they will lose money on.

However, shipments are coming through on old orders placed a few months ago. One group has bought over 30,000 tons of plates, sheets and billets from Belgium and Germany. About half of them have been delivered and part of the remainder is coming into the Great Lakes this week. They have also sold 5000 tons of reinforcing bars imported from Luxembourg. Other distributors report buying quantities of 4 and 5 thousand tons of sheets from France and the Benelux nations.

Import Over Conversion

Any accurate approximation as to the amount of foreign steel sold in the area is difficult to obtain because it comes in through many small distributors and in a variety of roundabout ways. Also, some warehouses are said to have been selling good quality foreign sheets without telling the customer of its pedigree.

Consumers are reluctant to publicize their purchases because it will tend to weaken their argument with the mills for more steel. One company is reported to have cancelled a conversion order for 20,000 tons of light plate because it was able to buy 25,000 tons of it directly from a foreign producer at lower than conversion prices.

Industry Again Faces Deferments Problem

Double task: Gear up production and increase labor force . . . Government names essential positions . . . Affects Guard and Reserves, has nothing to do with draft.

Washington — The industrialist will now have to deal with the twofold task of answering the emergency summons of his country by gearing his plant for defense production and at the same time seek to preserve and increase his labor force. He will unavoidably be bucking the Selective Service Act whose pace is now quickening.

But since the importance of the man behind the gun cannot be underrated and even with the need for troops in Korea approaching crucial proportions, a deferment policy, however stringent, was formulated last week for Reservists and National Guard members—men most fit for combat at this time. Thus recognition was granted to the need for most efficient production to bolster American fighting troops.

Bare Bones, at Least

Although a source here said last week that the policy adopted for Reserves and National Guard would not serve as a true pattern for more lenient Selective Service deferment practices, it will at least be the bare bones. Industry had best study it, for it may be a portent of things to come.

The basic criteria for deferment of reservists are the Dept. of Labor list of critical occupations and the Dept. of Commerce list of essential activities.

The reservist deferred must be engaged in a critical occupation necessary to a highly essential activity and he will be deferred only until he can be replaced. The three military services will administer the new policy.

All deferments will be made on an individual basis and may be terminated at any time because of overriding military considerations. Deferments for dependency are not included in the criteria. Their status differs from that of men called under the Selective Service Act.

Initial deferments of reservists in critical occupations in essential activities may not exceed a period of 6 months, and no extension may be for more than a period of 6 months. At the end of the specified period each case will be reviewed to determine if cause for delay still exists, and Secretary Johnson directs that a stricter application of the criteria for deferment be made in evaluating renewals. Application for deferment should be made by the Reservist or his employer in writing at the time of call.

The Dept. of Labor list of critical occupations is broken into two parts, professional and skilled occupations. It was based on demand which would exceed total supply under conditions of full mobilization, a minimum training time of 2 years or equivalent experience necessary to perform the tasks found in the occupation, and the essentiality of the occupation to the industries in which it occurs. (See table below.)

The Dept. of Commerce list of essential activities is tentative and very broad, including all activities necessary to the civilian economy, in addition to mobilization needs. Excluded are so-called "frills and fancies." The Commerce Dept. emphasizes that it "will be subject to revisions depending on the degrees of emergency and requirements of the situation."

Gearing Industry Shows Rise

Pittsburgh—A 10.4 pct increase was registered in gearing industry activity for June on the basis of the AGMA index—1935 to '39 = 100. The index figure for June is 401.0, reported Newbold C. Goin, executive secretary of the American Gear Manufacturers Assn.

Cancels Drum Use Amendment

Washington — The proposed amendment prohibiting re-use of STC drums for shipments of inflammables was canceled by the Interstate Commerce Commission last week, announces M. A. Smith, of the Allied Industries Committee.

Dept. of Labor List of Critical Occupations

PROFESSIONAL AND RELATED OCCUPATIONS

Architect, Marine
Chemist, analytical
Chemist, biological
Chemist, organic
Chemist, physical
Chemist, inorganic
Die designer
Engineer, ceramic
Engineer, chemical
Engineer, civil
Engineer, electrical
Engineer, industrial
Engineer, mechanical
Engineer, mining
Engineer, petroleum
Engineer, chief, marine
Geologist
Geophysicist
Mathematician
Metallurgist, extractive
Metallurgist, physical
Plant pathologist
Teacher (critical occupations only)
Tool designer

SKILLED OCCUPATIONS

Aircraft mechanic
Aircraft-engine mechanic
Airplane mechanic
Apprentice (critical occupations only)
Boilermaker
Boiler lay-out man
Boiler fit-up man
Boiler-shop mechanic
Boilermaker, marine
Bricklayer, refractory
Coremaker
Die maker
Die setter
Electrician, airplane
Foreman (critical occupations only)
Glass blower, laboratory apparatus
Instrument repairman; aircraft instrument man; electrical instrument repairman
Lay-out man, marine
Loftsman, marine; mock-up assembler; loftsman, aircraft; boilermaker-loftsman
Machinist—includes: machinist; bench machinist; instrument maker; laboratory mechanic lay-out man; marine machinist; job setter
Maintenance, mechanic
Millwright
Model maker
Molder—includes only: molder, bench; molder, finish; molder, floor; molder, pattern
Patternmaker
Petroleum cable driller
Petroleum rotary driller
Precision-lens grinder
Precision-lens polisher
Roller, iron and steel
Stillman, petroleum processing
Tool and die maker
Tool maker

Timken Division Now Uses Graphite Coating for Ingot Molds

Obviates noisome smoke from tar . . . Ingot quality not sacrificed.

Canton, Ohio—A graphite coating for interiors of ingot molds to eliminate obnoxious fumes and smoke from steel-making operations has been developed by Timken Roller Bearing Co.'s steel and tube division.

The mixture of graphite and water as a substitute for tar in coating ingot molds was adopted by Timken after 9 years of experimentation with various types of coatings, said John E. Fick, vice-president in charge of the division.

Couldn't Sacrifice Quality

Because tar coating ingot molds gave an excellent surface to the ingot and prolonged the life of the mold wall, researchers had to find a coating that would not cause a loss of quality. Reportedly they have succeeded with graphite.

Mr. Fick said equipment costing $12,000 had to be acquired for change-over and that the new coating method requires 35 pct more man-hours than the old tar method.

Use of the new coating has improved working conditions and also has relieved residents in the vicinity from the obnoxious smoke resulting from the use of tar.

To Build Four Great Lakes Ships

New York—Four ships to carry iron ore and limestone on the Great Lakes will be built, starting immediately, by Pittsburgh Steamship Co. and Bradley Transportation Co., iron ore and limestone carrying subsidiaries of the U. S. Steel Corp., respectively.

Irving S. Olds, chairman of the corporation, stated that the ships will augment carrying capacity in recognition of the national defense emergency. Pittsburgh Steamship Co. will get three standard bulk type ore haulers of 18,000 ton capacity each. The Bradley firm will build one self-unloading ship of 18,000 ton capacity. Completion is slated for the opening of the 1952 ore shipping season, normally beginning early in April.

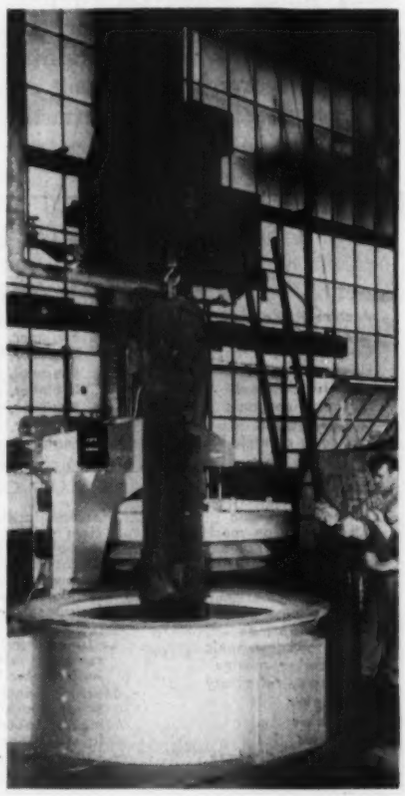
Loewy Div. Gets Austrian Order

New York—The Alpine Montan Co., of Austria, has placed a second order for structural mill equipment, amounting to $1 million, with the Loewy Rolling Mill Div., Hydropress, Inc., New York. Previously the American firm had furnished the Austrian mill with heavy blooming mill equipment.

Baldwin Sells 64 Diesels

Philadelphia — Orders for 64 diesel-electric locomotives have recently been placed with the Baldwin Locomotive Works here. They range from 750 hp to 1600 hp. The largest single sale was 38 for the Equitable Life Assurance Society which will lease them to the Baltimore & Ohio RR Co.

THE HEAT'S ON: A 4-ton forging is withdrawn from a Hevi-Duty Electric Co. stress-relieving furnace at the Cleveland plant of the Cleveland Pneumatic Tool Co., where $130,000 worth of heat treating equipment has recently been installed. The equipment was designed especially for extra large landing gear forgings.



First Canadian Stainless Sheet Mill to Start Operation

Atlas to become first Canadian producer . . . Initial output limited.

Welland, Ont. — Atlas Steels Ltd. is staking out the first Canadian claim to that country's stainless sheet demand. Now on trial rollings, Atlas' stainless sheet mill, the first in Canada, will be ready for commercial production by September.

Although the mill is initially set up to produce 3/16 in. to 26 gage sheets up to 48 in. wide and 144 in. long, it will concentrate first on the heavy gages. For the present, the Atlas mill will turn out only chromium-nickel grades in sheets AISI types 302, 304, 305, 309, 316, 321, and 347. Available finishes will be No. 1 hot-rolled, annealed and pickled, and No. 4 Standard Polish.

To Import Sheets

Because variety of initial production will be limited, Atlas will broaden its stock for sale to Canadian customers by importing all grades, finishes, sizes and products not produced at Welland. Among the imports will be cold-rolled sheets 18 gage and lighter, cold-rolled strip in coils, and heavy plates.

In a statement of policy, Atlas said it recognized that mill capacity would surpass immediate demand. It expects that the Canadian use of stainless will develop. To foster this Atlas is conducting a 3-year program of market development.

Hand Mills Economical

Two of the mills installed by Atlas are hand mills, declared obsolete and uneconomical in America. Atlas reasons that for a limited demand continuous mills would remain idle for long periods while hand mills would be occupied full-time. Because it made the first move and because of the size of the Canadian market, Atlas anticipates that it will be the sole producer of Canadian stainless sheets for a while.

British Laborites Teeter On Steel Nationalization Problem

Korean war and increased military spending gives pause to think.

London — Labor members of Parliament are teetering on a tight rope of indecision in a gusty wind. They must choose between their ideological wish to nationalize the steel industry despite the initial chaos this might invoke or keep British steel thriving in private hands to meet the strenuous military demands.

Evade the Question

They successfully eluded making mention of their problem in recent sessions and have now slipped into the haven of summer recess. Under the act, an Iron and Steel Corp. is to be set up but its members cannot be named until Oct. 1. The steel question may again be raised when Parliament reassembles on Oct. 18.

Many Laborites long unbudging on the principle of nationalization have been given pause to think by the explosion in Korea. Increased defense expenditure to $9,520 million over the next 3 years will necessitate a steel industry that is capable of working at maximum efficiency — not one that has been reorganized for a journey to eventual Utopia.

Works Both Ways

While the government exhorts steel management to frenzied efforts on its behalf, it cannot at the same time plot for management's undoing. Cooperation, Laborites realize, must work both ways.

Full-scale nationalization is not possible before Jan. 1, 1951. If the government, to gain productive strength, decided to play the opportunist and grant steel temporary surcease from worry, it would incur the displeasure of Labor voters. But it is almost certain of support from Labor politicians.

To placate the Conservative and Liberal elements of Parliament so that it can push through vital measures, the government may now be willing to swap nationalization delay for cooperation. Labor's slender majority must also be considered.

Government Aims to Boost Steel, Aluminum Production

Washington — New steps were taken this week looking toward expansion of steel and aluminum production.

Four scrambled steelmaking facilities at Warren were sold by General Services Administration to Copperweld Steel Co. subject to the security clause. The purchase price was given as $2 million and the rated wartime capacity was nearly 150,000 tons of alloy steels.

In the meantime, Rep. Engle, D. of Calif., said that the National Security Resources Board was giving top priority to the study of a proposal for new aluminum facilities for the West Coast. The Interior Dept. has agreed to supply power if the plant were constructed near Shasta Dam, Mr. Engle said.

Also Sen. Kilgore, D. of W. Va., said that the White House had advised him to take up directly with the NSRB a proposal that the ordnance plant at Morgantown, W. Va., be restored to standby status.

"Never mind who this is, Mrs. Jones. This is just to tip off that your hubby finally got that $10 raise he's been after."

Form New Corporation To Make Oil Refinery Fittings

St. Louis—A newly-formed corporation, the Burkhart Engineering Co., with offices at 1221 Locust St., this city, will design and manufacture oil refinery fittings (return bends).

Merle E. Burkhart

President is Merle E. Burkhart, a mechanical engineer registered with Missouri. Previously he served with the Key Co., East St. Louis, Ill., as chief engineer, vice-president in charge of engineering, and vice-president in charge of sales, progressively. In 1945 he joined K. P. Wesseling Co., machinery dealer of St. Louis.

Incorporators are Mr. Burkhart, K. P. Wesseling, and H. H. Stern, Other officers include: Mr. Wesseling, vice-president and treasurer; Mr. Stern, secretary; W. W. Blase, assistant secretary. H. Schlarman, of 6738 Hollywood Blvd., Calif., is sales manager of the West Coast office.

To Build Altoona Plant

Johnstown, Pa.—National Radiator Co. has announced plans for the construction of a $1 million plant at Altoona, Pa. Scheduled for completion sometime in December, the new plant is expected to be operating by Jan. 1, 1951.

Some sheet metal operations will be shifted to the new plant and room will thus be made for new product facilities at the Johnstown plants and the Altoona plant, stated Robert S. Waters, president.

Revere Earnings Up 168 Pct

New York—First half net income of Revere Copper and Brass, Inc., totaled $4,810,425. This equals a $3.58 dividend on each share of common stock outstanding. It is an increase of 168 pct over the $1,791,590 earned during the same period last year.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

Our Neighbor To The North

"TAX RISE MAY BE AVERTED." This is the front page headline on a story dealing with the financial cost of the Korean War appearing in the *Montreal Daily Star* on Saturday, July 29. Bear in mind that this far-eastern United Nations "police action" had been under way for more than a month, that the North Koreans had already broken through a corridor on the west, and the press, both Canadian and American, was speculating on the possibility of another Dunkerque.

The *Star* quoted a senior Treasury executive to the effect that Dominion revenue was approximating the Finance Minister's estimates and "that in spite of $50 million which the nation is committed to spending on the Korean War over the balance of the year, no Treasury deficit will result." Another spokesman of the Finance Dept. stated that "Speculation on tax increases and the likelihood of inflation as a result of the Korean fighting are at least premature."

Nor does there seem any likelihood at the time of writing that Canada will restore rationing, limit credit, impose price ceilings, or place labor and industry in the strait jacket of government control. This is not due to any complacence regarding the military predicament in which United Nations forces find themselves on the Korean Peninsula. Nor is there any myopic faith north of the border that a formula may be evolved under which the boys in the Kremlin will blow the whistle and stop the shooting.

The Canadians appreciate the full gravity of the crisis. They know that any violent onslaught directed against this country is likely to take its course through Canadian territory. British Columbia and Manitoba are nearer the fighting front than Ohio and North Carolina.

If blood pressures fail to run higher north of the border it is not because they are in any less danger. They regard the affair in Korea with a sophisticated perspective which we might do well to copy. Long before this country "assumed international leadership" the Dominion was contributing men and materiel and funds to England while she was performing her function as the world's policeman. She stands ready now to make a similar contribution for a substantially similar purpose. Canadians do not think this is the opening of another world war which will repeat the pattern of 1939-45. They do not thing that the occasion calls for a surrender of personal liberties, for full scale national mobilization, for the socialization of industry, for the employment of a vast horde of public functionaries to direct the citizen in his ordinary daily life.

The calm atmosphere of Ottawa contrasts with the irrelevant heroics of Washington. The Reds broke through the 38th parallel on June 26 and now occupy almost the entire peninsula. Is this due to defective military and diplomatic intelligence or to the fact that the steel industry in this country operates under private management? Is the success of the Communists due to egregious miscalculation in the State Dept. or to the postwar rise in consumer credit?

The objective reader of Washington dispatches might assume that American military reverses are due to free enterprise, the rise in consumer credit, inadequate taxation, bargain basement haggling over financial aid to our allies, and penny-wise outlays for military purposes. For these are the "problems" to which Washington is currently giving such spectacular attention.

Plans for Export Controls On Steel Readied for Crisis Use

Washington — Plans are being wrapped up for clamping export controls back on steel, particularly carbon steel products, as soon as requirements for the stepped-up defense program take a more visible form.

Industry has expressed its willingness to go along with the government, current supply and demand was discussed with 23 representatives of manufacturers and exporters last week at which time a list of items for control and possible action were outlined by Commerce Dept. officials.

Insurance Measure

Reimposition of export controls currently would be largely a matter of insurance against future shortages and probably would have a relatively small effect on total tonnage. Cut-backs would likely be confined to a few specific types at first needed particularly by the military or which affect security.

The reason is that since late last year the percentage of steel output being shipped abroad has steadily declined from 6.4 pct to a figure of 2.6 pct at the end of March.

While the list of items was not made public, officials said that it included most, if not all, the items removed from the positive list last March, including two-score carbon steel products. They would not be placed back all at one time, however, but in staggered actions, it was said.

Weirton Plans Coal System

Pittsburgh—A coal storage and reclaiming system will be built by Koppers Co., Inc., at the Weirton, W. Va., plant of Weirton Steel Co., reports Joseph Becker, of Koppers. Scheduled for May 1, 1951 completion, the system, consisting of additional equipment and alterations, will enable Weirton to handle 500 tons of coal per hour into the coal storage area, with a similar capacity when reclaiming coal for coke oven use. About 250,000 tons will be stored on the site.

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The high-carbon ferro chromium we have recently developed is exceptionally free from non-metallic inclusions, entrapped slag and dissolved gases. It is made by a new process* which includes filtering out harmful inclusions by pouring the metal, as tapped from the furnace, through a layer of molten slag of special composition. In addition to removing the undesirable inclusions, this process also assures greater density of the metal and the absence of shrinkage cavities in individual lumps.

High-carbon ferro chromium contains 66 to 70 per cent chromium, 4 to 6 per cent carbon, and 3 per cent maximum silicon.

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ATF Cartoon Book, Coasters Gives Workers Economics Message

Elizabeth, N. J.—The lofty but obscure phraseology of the accountant finds no foothold in ATF Inc.'s annual economic reports to employees. This year the message was driven into workers' homes through a comic book medium and drinking glass coasters that unfolded with clarity a breakdown of expenses and profits. Before, ATF has used phonograph records and jigsaw puzzles to show the breakdown of its income dollar.

Steel Co. of Canada Rolls Record

Hamilton—A record tonnage of steel products was rolled in the first half of 1950 by the Steel Co. of Canada Ltd. The record was made possible by increasing ingot production to more than offset decreased shipments of semi-finished steel from other mills, reported H. G. Hilton, president.

He said that plans to add to basic steel and pig iron capacity are under study and ingot capacity has been added by improvement of technique and addition of equipment. The plans include additional openhearths, blast furnaces, and coke ovens.

To Seek Stronger, Cheaper Steel

Cambridge, Mass. — To seek a stronger, less expensive steel for automobiles, Massachusetts Institute of Technology will erect a $874,979 research laboratory under authorization granted by the city of Cambridge. The building will be made possible by the million dollar grant of Alfred P. Soan, Jr., chairman of the General Motors board of directors.

Westinghouse Buys War Plant

Pittsburgh—A 90,000 sq ft, war-built plant has been purchased by Westinghouse Electric Corp. with intentions of almost doubling its flashbulb production. Ralph C. Stuart said that operations may begin within 4 months and that automatic machinery is now being built.

Incentive System

London—The English worker has long been accused of lagging at work to offset mechanization and maintain a constant or increasing number of jobs. Perhaps because of this the Austin Motor Co. instituted in March 1948 a bonus scheme based on productivity. Since the bonus was introduced, output has been more than doubled.

More than $280,000 has been distributed to Austin workers at weekly award days. The amount to be awarded is in direct ratio to the previous week's production figure. As output began to soar, so did bonuses.

Acme to Supply Plants with Gas

Washington — Authorization to construct and operate 20 miles of 10, 8, and 6-in. transmission pipeline to the Pittsburgh area plants of Armco Steel Corp., Pullman-Standard Car Mfg. Co., and the Fretz-Moon Tube Co., was granted to the Acme Natural Gas Co. by the Federal Power Commission last week. Manufacturers Light & Heat Co., a Columbia Gas System subsidiary, was ordered to sell and deliver gas to Acme for the new line.

Patent Bills Introduced

Washington — Two bills were introduced in July in Congress to assist Richard F. Harvey in obtaining a patent on the heat treatment now known as Martempering. These are S. 3918 and H. R. 9210. A patent application was filed on this heat treatment early in 1940. This relates to work previous to Mr. Harvey's present employment as metallurgist at the Brown & Sharpe Mfg. Co.

Builds Double Duty Pipeline

Detroit—Now under construction, a 125-mile oil pipe line from Sun Oil Co.'s Toledo refinery to Sarnia, Ont., will deliver gasoline and furnace oils to Sun's terminal at River Rouge and will also carry liquefied gases to Sarnia, Ont. Completion of the line is tentatively set for about December 1.

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IF THEY DO, you will make large savings, Bronze-on-Steel bearings are extremely low in cost. They are manufactured by bonding pre-cast bearing bronze powder to strip steel, then forming to the required shapes. This combines an ideal alloy for the bearing surface with the strength and hardness of steel backing. These bearings have a higher Brinell hardness than cast bronze, much greater resistance to pounding and shock, and a comparatively low coefficient of friction. They are widely used in farm implements, in certain automotive applications, and many industrial applications. Perhaps you, too, should explore the possibilities of Johnson Bronze-on-Steel Bearings.

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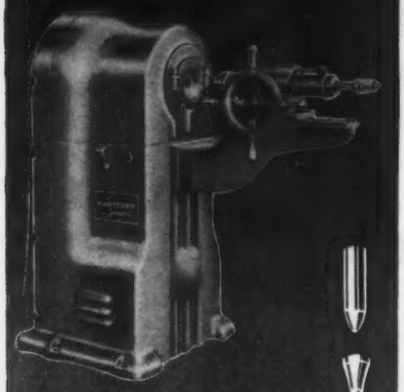

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Hartford Special Swagers feature hardened and ground liners in die slot of spindle for longer wear of operating parts. All swagers equipped with stop rods to assure even opening of die along entire length.

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• *News of Industry* •

STEEL CONSTRUCTION NEWS

New York—June bookings of fabricated structural steel were estimated at 266,531 tons, according to reports received by the American Institute of Steel Construction; the highest booking month since April, 1942 when 313,953 tons were recorded for the industry. Total bookings of 1,036,001 tons for the first six months of 1950 are 48% greater than for the same period in 1949 and some 8% higher than the first half of 1948 when 1,965,769 tons were estimated for the year.

Shipments amounted to 162,343 tons, practically the same as the average for the second quarter, but 6% less than the corresponding months of 1949. While total shipments for the six months are below the same period last year, they are 36% greater than the first half of the pre-war period 1936/1940.

The backlog (tonnage of orders booked and available for future fabrication) for the next four months only has increased to 579,583 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry		
	1950	1949	Avg.1936 -1940
CONTRACTS CLOSED			
January ...	119,317	130,418	107,578
February ..	117,664	108,764	96,280
March	189,420	149,079	124,558
April	153,758*	98,802	110,783
May	189,311*	116,975	126,237
June	266,531	96,952	125,835
Totals ...	1,036,001	700,990	691,271
SHIPMENTS			
January ...	135,253	152,746	92,578
February ..	129,628	145,879	88,626
March	156,781	185,885	115,031
April	163,246*	179,206	123,650
May	165,915*	171,101	123,225
June	162,343	172,260	129,969
Totals ...	913,166	1,007,077	673,079
TONNAGE AVAILABLE FOR FABRICATION WITHIN THE NEXT FOUR MONTHS	579,583	583,289	347,930

*Revised

Fabricated steel awards this week included the following:

5000 Tons, Middlesex & Union Counties, N. J., New Jersey Turnpike Authority, Contract 38, through Brann & Stuart, Philadelphia, to American Bridge Co., Pittsburgh.

2000 Tons, Burlington & Monmouth Counties, N. J., New Jersey Turnpike Authority, Contract 37, through Conduit & Foundation Corp., Philadelphia, to American Bridge Co., Pittsburgh.

1600 Tons, Baltimore, Mt. Wilson State Hospital, to Cramer, Vollmerhausen, Baltimore.

1560 Tons, Gloucester, Camden, Burlington Counties, N. J., New Jersey Turnpike Authority, Contract 53, to Harris Structural Steel Co., New York.

1060 Tons, Milwaukee, Ladish Co. to Worden-Allen Co., Milwaukee.

1000 Tons, Baltimore, University of Maryland hospital, Joseph Hughes, Baltimore, low bidder.

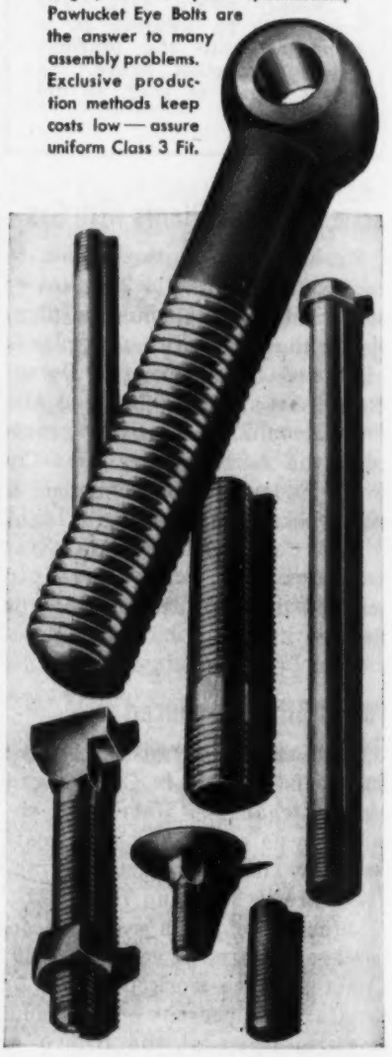
1000 Tons, Middlesex & Union Counties, N. J., New Jersey Turnpike Authority, Contract 57, to George M. Brewster & Sons, Bogota, N. J.

800 Tons, Hollidaysburg, Pa., buildings for Hollidaysburg State Hospital to Bethlehem Steel Co., Bethlehem.

Continued on Page 100

Looking for specialties
EYE BOLTS

Accurately made in sizes ¼" and larger, or to your specifications, Pawtucket Eye Bolts are the answer to many assembly problems. Exclusive production methods keep costs low — assure uniform Class 3 Fit.



BETTER BOLTS SINCE 1882

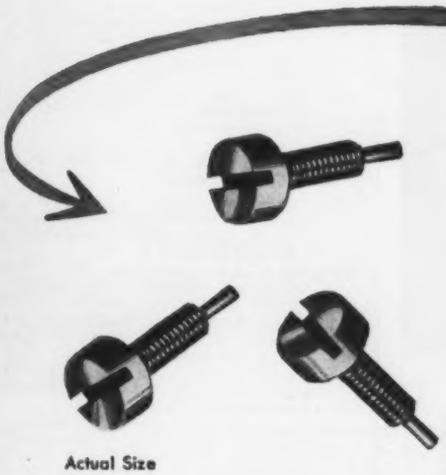
Use Headed and Threaded Fasteners for Economy and Reliability

PAWTUCKET
MANUFACTURING COMPANY
327 Pine Street Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS

"AT FIRST WE COULDN'T MAKE THESE PARTS FROM TYPE 416 STAINLESS"

Machines were down much of the time because tools (and parts) frequently broke when they used Type 416 Stainless bars from the old source. Now these aircraft parts are produced without trouble — and a final grinding operation is eliminated — because of the better machined finishes with Carpenter Stainless No. 5 (Type 416). Very few rejects, good finishes and no tooling troubles now that they order Carpenter Stainless bars for every production run.

Actual Size



Actual Size

TOOLS WERE REGROUND EVERY 4½ HOURS ON THIS TYPE 303 STAINLESS JOB

(and then they called Carpenter)

Tools now go many times longer between grinds. Savings in grinding time are $456.00 a year and there are fewer tools to make. Because they asked Carpenter for help in machining Stainless, they get several thousand extra parts per month because of less machine down time. And best yet, there are no rejects, no burrs on parts made from Carpenter Stainless No. 8 (Type 303).

To get your Stainless machining jobs done at the lowest possible cost, do as these firms did. Send your order to Carpenter.

THE CARPENTER STEEL COMPANY, 121 W. Bern Street, Reading, Pa.

TURNING, DRILLING, REAMING — all machining jobs are easier to get done right if you use Carpenter's "NOTEBOOK on Machining Stainless". If you don't have a copy, drop us a note on your company letterhead.

When You Have a Stainless Problem — You Can Count on Carpenter for the Answer

more than corrosion resistance

Carpenter

FREE-MACHINING

STAINLESS STEEL

Direct Mill Branch Warehouses and Distributors in Principal Cities. EXPORT DEPARTMENT: Woolworth Bldg., New York 7, N.Y. "CARSTEELCO"

"New Process"
Punches • Dies • Rivet Sets
Compression Riveter Dies
Chisel Blanks

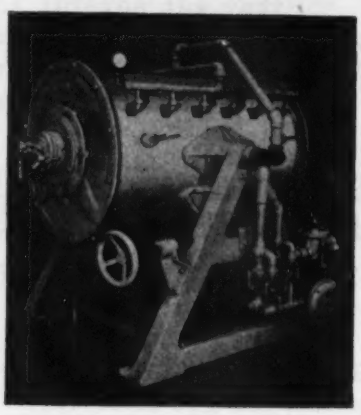
Made from high-grade alloy tool steels properly heat-treated of uniform high quality —may be purchased with complete confidence for maximum service.

Write for Catalog 46

GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL ST., CHICAGO 8, ILL.

ROTARY GAS CARBURIZERS

A "First" by A.G.F. Co.



Versatility is the outstanding characteristic of AGF Rotary Gas Carburizing Furnaces, which may be used not only for carburizing, but also for clean hardening, normalizing, annealing, and other general or atmospheric work without modification to the furnace of any kind.

Uniform heating of the work is assured by the gentle mixing produced by the rotary action of the retort, which is heated by numerous carefully distributed and balanced gas burners. Carburizing or atmosphere gas is introduced through a simply-designed, trouble-free connection.

Charging and discharging of the work is accomplished by means of a tilting feature, which is power-driven on the larger models. The retort remains within the heat at all times.

The furnace shown above is the latest, improved AGF Rotary Gas Carburizer, batch type, with new maintenance-free roller bearing retort support.

AGF gas carburizing equipment also includes Continuous Rotary Furnaces and Vertical Retort Carburizers. Write for literature.

AMERICAN GAS FURNACE CO.
1004 LAFAYETTE ST., ELIZABETH, N. J.

Steel Construction News

Continued

600 **Tons,** Skokie, Ill., Powers Regulator plant to New City Iron Works, Chicago.

525 **Tons,** Forest Hills, N. Y., apartment house, to Grand Iron Works.

500 **Tons,** Baltimore, Pennsylvania Railroad, Mulberry St. bridge, A. S. Wikstrom, Skaneateles, N. Y., low bidder.

500 **Tons,** Philadelphia, apartment house at Green St., to Belmont Iron Works, Philadelphia.

435 **Tons,** Washington, Sears Roebuck & Co. warehouse, through Irwin & Leighton, Philadelphia, to Belmont Iron Works, Philadelphia.

410 **Tons,** York County, Pa., Pennsylvania Dept. of Highways, LR 126 (4), through J. R. Missley, Landisville, Pa., to Fort Pitt Bridge Works, Pittsburgh.

Fabricated steel inquiries this week included the following:

3000 **Tons,** Crawford County, Pa., Pennsylvania Dept. of Highways, due Aug. 25.

2300 **Tons,** Trenton, N. J., bridge over the Delaware, Delaware River Toll Bridge Commission, due Aug. 31.

1270 **Tons,** Lathe, Kan., U. S. Navy steel tanks.

690 **Tons,** Schuylkill County, Pa., Pennsylvania Dept. of Highways, LR 185 (5), to be rebid Aug. 18.

Reinforcing bar awards this week included the following:

1887 **Tons,** Trenton, N. J., New Jersey Dept. of Highways Route 26 extension 2a, to Acchione Contracting Co., Philadelphia.

1700 **Tons,** Lawrenceville, Ind., Indiana Michigan Electric Co., project to Joseph T. Ryerson and Son, Chicago.

1500 **Tons,** Cleveland, southerly sewage disposal plant, to Paterson-Leigtch Co., Cleveland.

1500 **Tons,** Minneapolis, St. Anthony Falls lock and dam, to Paper-Calmenson and Co., St. Paul.

1200 **Tons,** Moorestown, N. J., New Jersey Turnpike Authority, Contract 37 (3), through Conduit & Foundation Corp., Philadelphia, to Bethlehem Steel Co., Bethlehem.

1000 **Tons,** Bethlehem, Pa., sewage treatment plant, Thompson Construction Co., Albany, low bidder.

900 **Tons,** Gloucester County, N. J., New Jersey Turnpike Authority, Contract 53 (2), F. A. Canuso & Son, Philadelphia, low bidder.

900 **Tons,** Burlington, Mercer Counties, N. J., New Jersey Turnpike Authority, Contract 57 (3), George M. Brewster & Son, Bogota, N. J., low bidder.

400 **Tons,** Snyder County, Pa., Pennsylvania Dept. of Highways, LR 229, Shaller & Hoffmeister, Schuylkill Haven, Pa., low bidder.

300 **Tons,** Wauwautosa, Wis., high school and convent, to Ceco Steel Products Co., Chicago.

Reinforcing bar inquiries this week included the following:

3000 **Tons,** Great Falls, Mont., Tiber dam and dike construction, Lower Marias unit, Marias Div., Mont., Missouri River Basin Project, Bureau of Reclamation, Spec. 3128, bids to Aug. 15.

475 **Tons,** Mackinaw City, Mich., ferry dock.

433 **Tons,** Los Angeles, Calif., box girder bridge, grade and pave road connections over Harbor Freeway at 4th St., California Div. of Highways, Los Angeles, bids to Aug. 17.

410 **Tons,** Cleveland Gordon Park seawall, Ohio State Project 289.

360 **Tons,** Jeffersonville, Ind., Colgate-Palmolive-Peet Co.

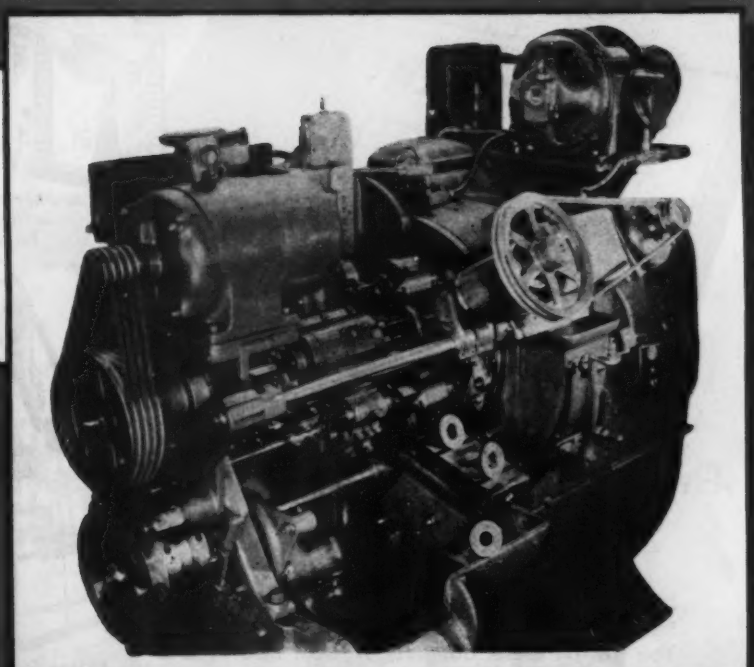
Steel plate awards this week included the following:

675 **Tons,** Marcus Hook, Pa. and Toledo, Ohio, tanks for Sun Oil Co., to Chicago Bridge & Iron Co., Chicago.

230 **Tons,** Chatham Township, Pa., standpipe, through American Water Works Service Co., to Chicago Bridge & Iron Co., Chicago.

No. 76 H CHUCKER

Has VERSATILITY



You can combine turning, drilling, tapping, threading, milling, etc., operations.

TRY "Baird" for high production of Automotive Parts requiring finely finished surfaces and close limits.

For Instance:

The picture shows a tool set-up to turn the O.D. and top of a small piston and then cross drill the wristpin hole in the piston in a located position, in one handling and the same machine tooled to turn and then drill the six holes in the cylinder cover plate shown in the picture.

Some of the EXCLUSIVE FEATURES which have made the Baird 7 Six-Spindle Horizontal Indexing Lathe outstanding are:

• INDEPENDENT TOOL SLIDES

The longitudinal tool slides may have different strokes and the cross slides are independent and have their strokes, all as best suits the job. All tool slides have micrometer adjustment.

• DIFFERENT SPEEDS AT SPINDLES

Ability to choose a speed for the spindle at each work station to suit the operation to be performed at that station permits the best product in least time.

• AUTOMATIC CHUCKING

Operator has both hands free to handle the work. No levers or handles to require his attention or take his time.

• ATTACHMENTS

Several readily applied attachments are available to perform extra operations and reduce handling, thus speeding production.

• AUTOMATIC MECHANICAL STOP

Stops machine at end of each cycle if operator has not unloaded and reloaded in the proper operation of machine. This and other safety features make for least loss due to damage, and for greatest safety.

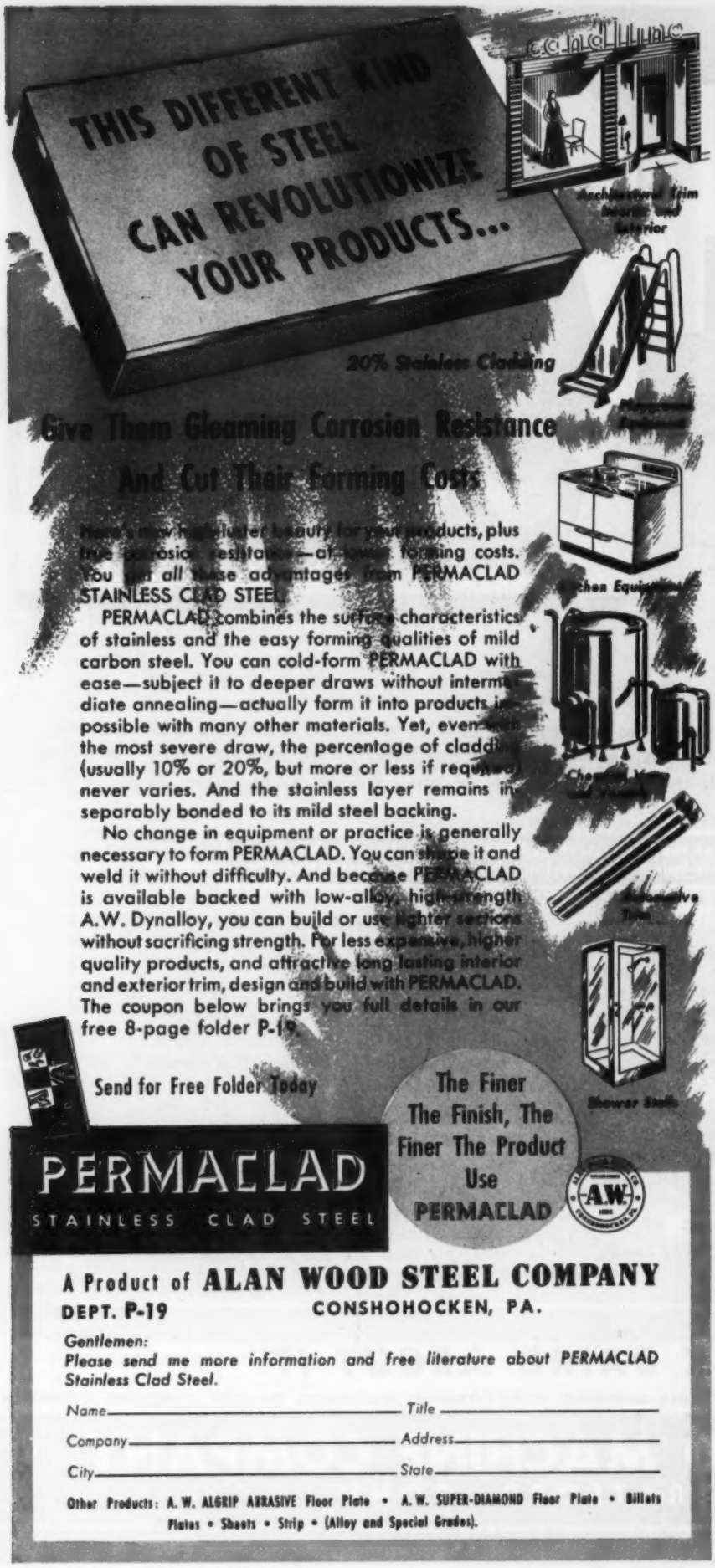
AUTOMATIC MACHINERY BAIRD STRATFORD CONNECTICUT U.S.A.

"ASK BAIRD ABOUT IT"

OTHER BAIRD MACHINES: MULTIPLE SPINDLE GRINDERS, WIRE FORMING MACHINES, PRESSES, TUMBLING EQUIPMENT

THE BAIRD MACHINE COMPANY

STRATFORD, CONN.


THIS DIFFERENT KIND OF STEEL CAN REVOLUTIONIZE YOUR PRODUCTS...
20% Stainless Cladding
Give Them Gleaming Corrosion Resistance
And Cut Their Forming Costs
PERMACLAD combines the surface characteristics of stainless and the easy forming qualities of mild carbon steel. You can cold-form PERMACLAD with ease—subject it to deeper draws without intermediate annealing—actually form it into products impossible with many other materials. Yet, even on the most severe draw, the percentage of cladding (usually 10% or 20%, but more or less if required) never varies. And the stainless layer remains inseparably bonded to its mild steel backing.
No change in equipment or practice is generally necessary to form PERMACLAD. You can shape it and weld it without difficulty. And because PERMACLAD is available backed with low-alloy, high-strength A.W. Dynalloy, you can build or use lighter sections without sacrificing strength. For less expensive, higher quality products, and attractive long lasting interior and exterior trim, design and build with PERMACLAD. The coupon below brings you full details in our free 8-page folder P-19.
Send for Free Folder Today
The Finer The Finish, The Finer The Product Use PERMACLAD
PERMACLAD
STAINLESS CLAD STEEL
A.W.
A Product of ALAN WOOD STEEL COMPANY
DEPT. P-19 CONSHOHOCKEN, PA.
Gentlemen:
Please send me more information and free literature about PERMACLAD Stainless Clad Steel.
Name _____ Title _____
Company _____ Address _____
City _____ State _____
Other Products: A. W. ALGRIP ABRASIVE Floor Plate • A. W. SUPER-DIAMOND Floor Plate • Billets Plates • Sheets • Strip • (Alloy and Special Grades).

FREE

PUBLICATIONS

Continued from Page 34

can be arranged for manual, mechanical or motor operation in new or old industrial and commercial buildings, embody galvanized steel sections and a number of other outstanding features, as presented in the bulletin. *Kinnear Mfg. Co.*

For free copy insert No. 8 on postcard, p. 35.

For Better Mulling

A new 36-p. catalog covering the complete line of Speedmullors gives information on foundry sand mulling and the progress of mulling. The exclusive feature of this equipment for cooling hot sand during the mulling cycle is explained and illustrated, and complete specifications for six different models are presented. *Beardsley & Piper Div., Pettibone Mulliken Corp.*

For free copy insert No. 9 on postcard, p. 35.

Vises and Clamps

Design features of the complete line of Wilton vises, C-clamps, work positioners and other items are described in a new 32-p. catalog. Specifications and prices are given, as well as information on replacement parts. *Wilton Tool Mfg. Co.*

For free copy insert No. 10 on postcard, p. 35.

Overhead Cranes

The safety, durability, and dependable operation of Northern Hi-Lift cranes are described in a new 8-p. catalog. Various components of the equipment are shown, and a series of action photos show typical installations. *Northern Engineering Works.*

For free copy insert No. 11 on postcard, p. 35.

Saves Time, Material

Jessop Cast-to-Shape tool steels offer pronounced savings of time, labor, material and machining costs, as described in a new 14-p. catalog. Castings made from tool steels, stainless and heat resisting steels are shown, together with heat treating instructions and other pertinent data of value to potential users. *Jessop Steel Co.*

For free copy insert No. 12 on postcard, p. 35.

Resume Your Reading on Page 35

C-O-TWO

ANNOUNCES

Underwriters' Laboratories, Inc. Listed

Low Pressure Carbon Dioxide Type Fire Extinguishing Systems

ECONOMICAL, EFFICIENT FIRE PROTECTION
from a single storage tank

C-O-TWO now adds another outstanding contribution to modern fire fighting . . . C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing Systems. Carbon dioxide stored in bulk under low pressure, means greater fire protection for your larger size fire hazards at less cost.

Flexibility is the keynote of these new type C-O-TWO Fire Extinguishing Systems . . . the low pressure carbon dioxide storage tanks range in capacities from one to fifty tons, and can be operated as straight manual, partially automatic or fully automatic systems.

Flammable liquids, electrical equipment, storage and manufacturing processes can all be made firesafe from a single low pressure carbon dioxide storage tank. If fire strikes the system quickly goes into operation and the fast-acting, non-damaging carbon dioxide extinguishes the blaze in seconds.

COMPLETE CARBON DIOXIDE FIRE PROTECTION

With this new addition C-O-TWO offers complete, fully approved carbon dioxide fire protection . . . hand portables, wheeled portables, hose units, high pressure cylinder systems and low pressure storage tank systems. Whether your fire protection problem is a factory, mill, warehouse, power station or research center you have the assurance of the best type equipment for the particular fire hazard concerned.

Let an experienced C-O-TWO Fire Protection Engineer help you in planning up-to-date, fully approved fire protection now before fire strikes. Complete free information and descriptive literature available on request. Get the facts today!

C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

AFFILIATED WITH PYRENE MANUFACTURING COMPANY

DURALOY

Cast with very High Nickel!

Here are some Duraloy Castings with a 65% Nickel—15% Cr content, alloyed to meet exceptionally high temperatures and severe corrosion conditions in connection with Diffuser operations. This is more than a high nickel alloy; it's very high...somewhat out of the ordinary but indicative of what Duraloy is doing in the field of high alloy castings.

We have been specializing in high alloy static castings since 1922 and in high alloy centrifugal castings since 1931; both pioneering years. We have a big foundry, modern in every respect...modern in production, control, and test facilities. We have skilled metallurgists and foundrymen long experienced in the high alloy casting field.

In short, we are staffed and have every facility to serve you on high alloy castings up to 7½ tons, individual casting weight.

THE DURALOY COMPANY

Office and Plant Scottdale, Pa. • *Eastern Office* 12 East 41st Street, New York 17, N. Y.

F. O. NELSON
743 McCormick Building
Chicago, Illinois

Detroit
F. B. CORNELL & ASSOCIATES

METAL GOODS CORP. St. Louis • Houston • Dallas • Tulsa • New Orleans • Kansas City

NEW PRODUCTION IDEAS

Continued from Page 38

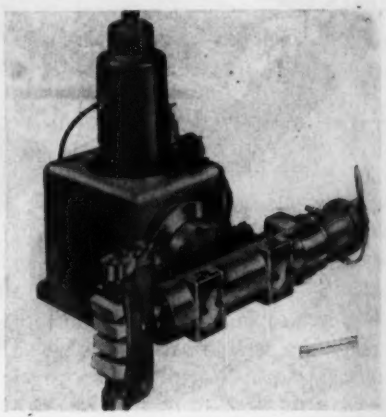
work station regulated by individual workers. At work stations palletized goods may be raised, lowered or rotated to convenient working position. Sections are manufactured in three standard widths and in 5 to 10-ft lengths. *Rapids-Standard Co., Inc.*

For more data insert No. 27 on postcard, p. 35.

Superfinishing Attachment

Used for cylindrical or flat work on ground or machined surfaces.

The largest in the line of superfinishing attachments is the No. 4 heavy duty attachment that is mounted on an engine lathe or



other suitable equipment. As the attachment is traversed along the work, the superfinishing stones contact the surface and scrub away the amorphous metal. The unit can give up to 1000 psi pressure with an adjustable oscillation rate of 42 to 250 strokes per min. One to four stones up to 1x1x6 in. can be mounted in the quick-change stoneholder. The complete unit is arranged for 220 v, single phase, 60 cycle ac or dc. *Gisholt Machine Co.*

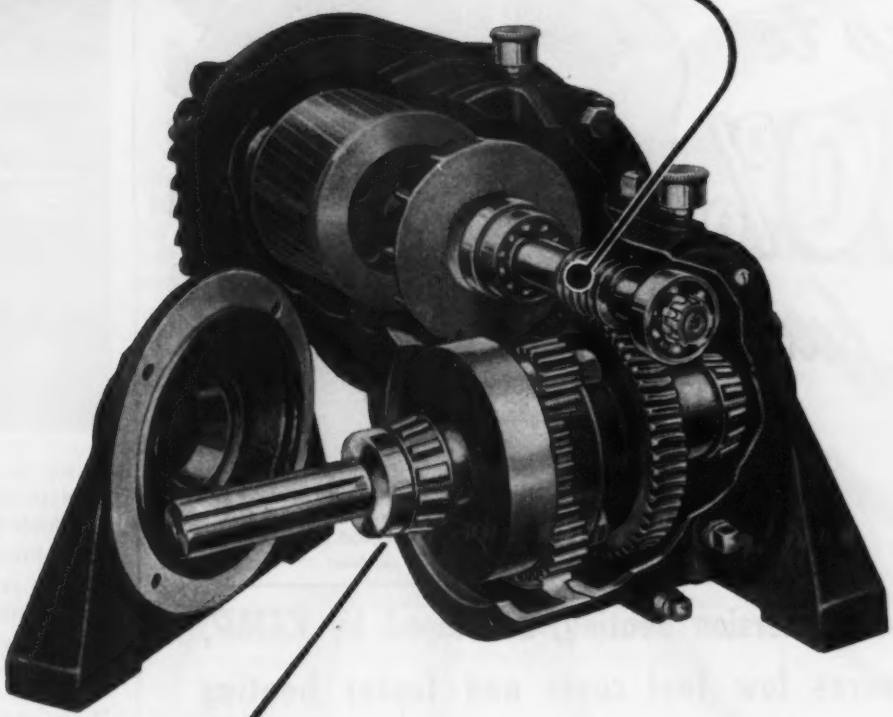
For more data insert No. 28 on postcard, p. 35.

Hot Trimming Device

Welded rail costs trimmed; grinding operations reduced.

A hot trimming device is reported to have reduced the grinding operations on welded rails to one-fifth of the usual amount needed, with important savings in

DEPENDABLE *Low-Speed* POWER



Janette *motorized and motorless*

SPEED REDUCERS

"the right speed, the right power"

Both gear-motors and gear-boxes feature worm and combination worm-and-planetary gearing, preferred by industrial engineers and designers for these advantages:

COMPACTNESS
POSITIVE RATIO OF SPEED REDUCTION
LONGER SERVICE LIFE
SAFETY

WRITE FOR BULLETIN 3-100

Janette

MANUFACTURING COMPANY
556 W. Monroe Street
Chicago 6, Illinois

melt metal and save up to 40% on fuel!

Kemp Immersion Pots are available in all sizes. Shown here is a 44" Pot. Capacity: 10,000 lbs., casting rate: two tons per hour!

How immersion heating, developed by KEMP, assures low fuel costs and faster heating for both large and small melting units.

For maximum economy in melting soft metals, lead, pewter, tin or salt—install modern Kemp Immersion Heating! Actual cases prove that Kemp Immersion Heating cuts fuel bills up to 40% and more. Provides rapid heat recovery in ⅓ the time . . . assures the high thermal efficiency for both large and small units!

POSITIVE HEAT CONTROL

Replace conventional heating or melting equipment with modern, efficient Kemp Immersion Pots and *save money*. There's no brickwork to steal heat . . . no external combustion chamber . . . no carbon monoxide . . . no temperature overrun. You get *high melting rates*, reduced dross formation, speed of temperature recovery after adding cold materials . . . PLUS an estimated fuel saving of up to 40% and more!

SEND FOR DETAILS

The Kemp Carburetor, part of each installation, assures complete combustion with no waste. One-pipe air and fuel feed reduces installation costs, simplifies maintenance. Get the facts. Find out how much you can save. Fill out and mail coupon for Bulletin IE-11 today!

KEMP *IMMERSION MELTING POTS*

OF BALTIMORE

CARBURETORS
BURNERS
FIRE CHECKS
ATMOSPHERE & INERT GAS GENERATORS
ADSORPTIVE DRYERS
METAL MELTING UNITS
SINGEING EQUIPMENT
SPECIAL EQUIPMENT

THE C. M. KEMP MFG. CO., Dept. C-8
405 E. Oliver St., Baltimore 2, Md.

Gentlemen: Please send me Information Bulletin IE-11.

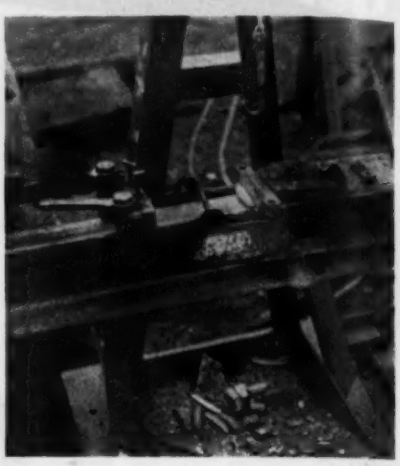
Name .....

Company .....

Address .....

City ..... Zone ..... State .....

grinding wheels and manhours. With the new hydraulic trimming device, tools tipped with Haynes Stellite hard-facing alloy plane the top and sides of the rail ball to a close tolerance, thus reducing the



grinding operations. The weld area is trimmed at a temperature of 2000°F. If the trimming is done immediately following welding, no reheating is required. *Oxweld Railroad Service Co. Unit of Union Carbide & Carbon Corp.*

For more data insert No. 29 on postcard, p. 35.

Universal Vise

Four separate planes of adjustment for grinding, drilling, milling.

The Univise fits any surface grinder or tool grinder and can be used on a drill press or other machine without table slots because

the keys in its base can be detached. Each of the parts can be rotated; each has a circular scale of 360°. The vise is 5 13/16 in. high x 6 in. wide x 7¼ in. long. Its jaws take up to 1½-in. tools. *Delta Power Tool Div. Rockwell Mfg. Co.*

For more data insert No. 30 on postcard, p. 35.

Resume Your Reading on Page 39

MARKET

Briefs and Bulletins

tubing from England—More foreign steel will find its way into America with recently completed contracts for steel tubes to be used in oil and gas pipelines. Contracts totaling $5,600,000 have been placed by American oil and natural gas companies with Stewarts & Lloyds, Ltd., which will produce the tubes in its Scotland, English Midlands, and South Wales plants. One of the largest orders was placed by Standard Oil of New Jersey.

buys blast furnace—Central Iron & Steel Co., Harrisburg, Pa., has concluded the purchase of the blast furnace at Chester, Pa. The company, a wholly owned subsidiary of Barium Steel Corp., plans to put the furnace into operation as quickly as possible. Some repairs will be required to put the furnace into operating condition after its long period of inactivity.

road buys diesels—Purchase of 41 diesel-electric locomotives and construction of facilities for their operation has been authorized by the Louisville and Nashville Railroad. Total cost will run to $6,500,000. The appropriation covers 25 diesel-electric "A" units for road freight service, 16 switching locomotives, and facilities.

duplication—One factor that may distort the intensity of demand is the placing of duplicate orders by consumers with several mills. But new customers are finding it almost impossible to get on order books. Some of them are getting help from warehouses who are having a harder time keeping inventories balanced and normal customers supplied.

demand—At least one steel producer is considering closing its books for a week to find out what its order acceptance is, so great has been the flood of business within the past 3 weeks. District offices are swamped. Delivery on nails, for example, has jumped from 10 days to 6 months.

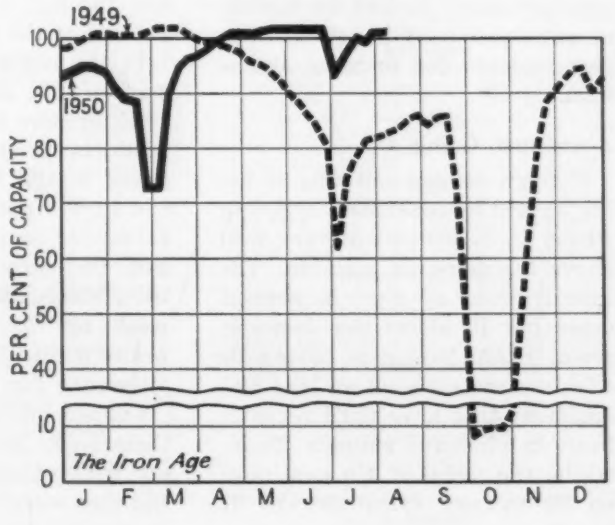
fluorspar up—The price of fluorspar was increased $2 a ton effective Aug. 1 by a major producer, bringing the price of fluorspar with 70 pct CaF content to $39.00 and the price with 60 pct content to $36.00 per net ton.

reparation sale—Bids will be opened by the Surplus Property Staff of the State Dept. on Sept. 26 for aluminum making equipment in the Bavarian Vereinigte works. The 160 units of potline equipment with an estimated annual capacity of 18,000 tons of pig aluminum has been awarded to the United States as reparations.

restores prices—Alan Wood Steel Co. has restored to former levels its prices on pig iron and steel billets cut some time ago. The company's pig iron prices are $2.00 a ton higher than recently. Carbon billets, rerolling, are $4.00 a ton higher; forging, $3.00 higher; and alloy billets are $2.00 higher.

conversion—If the military requirements for alloy steel are large, there will have to be a changeover from electric furnace sheet steel ingots to aircraft quality alloy steel. This would put a crimp in conversion arrangements based on electric furnace ingots.

Steel Operations



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
July 30	101.0*	101.0*	91.0	90.0	99.5*	104.0	101.0	104.0	103.0	103.5	88.0	86.5	125.0	101.0
Aug. 6	102.0	102.0	92.0	90.0	99.5	104.0	102.0	104.0	103.0	107.5	84.5	90.0	108.5	101.0

* Revised. ** Based on capacity, Jan. 1, 1950.

Nonferrous Metals OUTLOOK

Market Activities

Inflationary forces attack metal markets . . . Aluminum and copper scrap prices rise . . . Buying for conversion a factor . . . New zinc smelter strike hits market.

by JOHN ANTHONY

New York—Inflationary factors that have begun to appear in the metal markets have all the earmarks of the 1948 runaway markets. So far they have had no effect on the prices of primary metals. But the outlook is ominous. Prices of copper and brass scrap are advancing slowly, spurred on by consumer buying for conversion on a toll basis. Prices of aluminum scrap and secondary ingots are being pushed up rapidly in anticipation of heavy military requirements for primary aluminum.

Aluminum Going Up

Foreign copper and zinc is being bought by consumers at prices whose U. S. equivalents are well above the domestic markets. The export price of zinc is several cents per lb above the domestic price. Scare buying is having its effect on metals such as lead and antimony that have until recently been in plentiful supply. Meanwhile, the price of tin continues on its upward spiral toward $1 per lb.

Secondary aluminum prices quoted in this issue are more or less nominal. Aluminum smelters have been besieged by buyers ever since the announcement of the Alcoa allocations for pig and ingot. Last week Reynolds Metals Co. also began to allocate aluminum metal to customers. So prices of aluminum scrap have been rising every day for the last 2 weeks. Scrap is very scarce and smelters are finding it difficult to keep abreast of the market.

In the copper and brass scrap market, it is understood that mill stock brokers are paying full mill products prices for copper and brass scrap. Dealers are paying ½¢ to ¾¢ above refinery buying prices for copper scrap. Competition for scrap caused refineries to advance buying prices last week by ¼¢, bringing refinery prices within ¾¢ of the brass mill allowance for tonnage.

Copper producers have opened their books for September delivery without any change in price. But they were booking orders very cautiously due to the shortage of metal and the possibility of a price movement. The Senate Finance Committee was to take up the question of tariff suspension on Tuesday. But a visitor to Washington late last week could find no indication whether the measure would be reported out to the floor. The brass mills have not advanced their prices yet even though there is a strong possibility that they may be at a loss for the duty already paid.

Copper Premiums Paid

Copper buyers are in some instances taking foreign copper and foreign scrap for conversion at prices that would be the equivalent of 25¢ to 26¢ per lb here. This is anywhere from ½¢ to 3½¢ above the domestic market, depending on whether the tariff is paid. These premiums are being paid to avoid shutdowns of plant for lack of copper.

Although demand for zinc is far beyond the supplies available to the market, strikes in the smelting industry are causing a loss of zinc estimated at about 5000 tons a month. Last week a strike began at the Henryetta, Okla., plant of Eagle-Picher Mining & Smelting Co. The export price of zinc is now well above the domestic market, being quoted at 16¾¢ and higher at Gulf ports.

NONFERROUS METALS PRICES

	Aug. 2	Aug. 3	Aug. 4	Aug. 5	Aug. 7	Aug. 8
Copper, electro, Conn.	22.50	22.50	22.50	22.50	22.50	22.50
Copper, Lake, delivered	22.625	22.625	22.625	22.625	22.625	22.625
Tin, Straits, New York	98.00	97.75	98.50	....	98.50	99.00*
Zinc, East St. Louis	15.00	15.00	15.00	15.00	15.00	15.00
Lead, St. Louis	11.80	11.80	11.80	11.80	11.80	11.80

Note: Quotations are going prices.
*Tentative.

MILL PRODUCTS

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 27.4¢; 4S, 61S-O, 29.3¢; 52S, 31.4¢; 24S-O, 24S-OAL, 30.3¢; 75S-O, 75S-OAL, 36.8¢; 0.081 in., 2S, 3S, 28.4¢; 4S, 61S-O, 30.7¢; 52S, 32.8¢; 24S-O, 24S-OAL, 31.4¢; 75S-O, 75S-OAL, 38.5¢; 0.032 in., 2S, 3S, 30.0¢ 4S, 61S-O, 34.0¢; 52S 36.7¢ 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 48-1¢.

Plate: ¼ in., and heavier: 2S, 3S, F, 24.8¢ 4S-F, 27¢; 52S-F, 28.1¢; 61S-O, 27.6¢; 24S-F, 24S-FAL, 28.1¢; 75S-F, 75S-FAL, 34.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 67¢; 11 to 13, 34.3¢ to 79¢; 23 to 25, 36.3¢ to $1.08; 35 to 37, 43.3¢ to $1.66.

Rod Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34.5¢ to 51¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 37¢ to 32.5¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4, ⅛ to 11/32 in., 49.5¢ to 38.5¢; ⅜ to 1½ in., 33¢ to 36¢; 1 9/16 to 3 in., 36¢ to 33¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.; 2S, 36.5¢ to 27¢; 52S, 44.5¢ to 32.5¢; 56S, 47.5¢ to 39¢; 17S-T4, 50.5¢ to 35¢; 61S-T4, 45¢ to 34.5¢; 75S-T-6, 76.5¢ to 55.5¢.

Extruded Tubing, Rounds: 63S-T5; OD in in.: 1¼ to 2, 33.5¢ to 49¢; 2 to 4, 30.5¢ to 41.3¢; 4 to 6, 31¢ to 37.8¢; 6 to 9, 31.5¢ to 39.3¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.008; 96 in., $1.344; 120 in., $1.679; 144 in., $2.017. **Gage** 0.024 in. x 28 in., 72 in., $1.224; 96 in., $1.633; 120 in., $2.042; 144 in., $2.451. **Coiled Sheet:** 0.019 in. x 28 in., 24.7¢ per lb; 0.024 in. x 28 in., 23.7¢ per lb.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed)

Sheet and Plate: M-O, FS-O. ¼ in. 58¢ to 60¢; 3/16 in. 60¢ to 62¢; ⅛ in. 62¢ to 64¢; B & S gage 10, 63¢ to 65¢; 12, 67¢ to 69¢; 14, 73¢ to 78¢; 16, 80¢ to 85¢; 18, 88¢ to 93¢; 20, $1.00 to $1.05; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, FS, diam in., ¼ in. to 0.311, 66¢; ½ in. to ¾, 50¢; 1¼ to 1.749, 47¢; 2½ to 5 in., 45¢. Other alloys higher. Base: Up to ¾ in., diam, 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, FS, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 59.5¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 55¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 50.5¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 47.5¢ 4 to 6 lb per ft, per. up to 28 in. 46.5¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, FS, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	69	53
Strip, cold-rolled	75	56
Rods and bars	65	61
Angles, hot-rolled	65	61
Plates	67	62
Seamless tubes	98	86
Shot and blocks	..	46

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	37.43	....	37.03
Copper, h-r	....	33.28	....
Copper, drawn	....	34.53	....
Low brass	35.52	35.21	....
Yellow brass	34.19	33.88	....
Red brass	35.96	35.65	....
Naval brass	38.90	32.96	34.22
Leaded brass	....	28.54	32.65
Com'l bronze	36.93	36.62	....
Manganese bronze	42.40	36.27	37.85
Phosphor bronze	55.11	55.36	....
Muntz metal	37.13	32.69	34.94
Everdur, Herculoy, Olympic, etc.	42.05	40.99	....
Nickel silver 10 pct	45.48	47.74	....
Arch. bronze	....	....	32.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	17.50
Aluminum pig	16.50
Antimony, American, Laredo, Tex.	24.50
Beryllium metal, 95%, lumps, beads	$95.00
Beryllium copper, 3.75-4.25% Be, dollars per lb contained Be	$30.00
Beryllium aluminum 5% Be, dollars per lb contained Be	$65.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.15
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	22.50
Copper, Lake, delivered	22.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$160
Lead, St. Louis	11.80
Lead, New York	12.00
Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb	22.50
Magnesium, sticks, 100 to 500 lb	39.00¢ to 41.00¢
Mercury, dollars per 76-lb flask f.o.b. New York	$79 to $80
Nickel, electro, f.o.b. New York	51.22
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	44.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$74 to $77
Silver, New York, cents per oz.	72.75
Tin, New York	99.00
Zinc, East St. Louis	15.00
Zinc, New York	15.72
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	23.00
No. 120	22.50
No. 123	22.00
80-10-10 ingot	
No. 305	27.00
No. 315	24.50
88-10-2 ingot	
No. 210	35.50
No. 215	32.50
No. 245	27.00
Yellow ingot	
No. 405	19.75
Manganese bronze	
No. 421	25.50

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum - silicon alloys	
0.30 copper, max.	22.00-22.50
0.60 copper, max.	21.75-22.25
Piston alloys (No. 122 type)	21.00-21.25
No. 12 alum. (No. 2 grade)	20.50-20.75
108 alloy	20.75-21.00
195 alloy	22.00-22.50
13 alloy	22.50-22.75
AXS-679	21.25-21.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	22.00-22.50
Grade 2—92-95%	21.00-21.50
Grade 3—90-92%	20.00-20.50
Grade 4—85-90%	19.50-20.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33¾
Rolled, oval, straight, delivered	36.59
Forged ball anodes	41
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	23
Ball anodes	22
Nickel 99 pct plus	
Cast	68.00
Rolled, depolarized	69.00
Cadmium	$2.30
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	10¾
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	61¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound; add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	19½	18¾
Yellow brass	16¾	16
Red brass	18½	17⅝
Commercial bronze	18⅝	17⅝
Manganese bronze	16½	15⅝
Leaded brass rod ends	16½	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.75
No. 2 copper wire	18.75
Light copper	17.75
Refinery brass	18.00*
Radiators	13.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	19.75
No. 2 copper wire	18.75
Light copper	17.75
No. 1 composition	16.50-16.75
No. 1 comp turnings	16.00-16.25
Rolled brass	14.00-14.25
Brass pipe	15.50-15.75
Radiators	13.50
Heavy yellow brass	12.00-12.25
Aluminum	
Mixed old cast	12.25-12.50
Mixed old clips	13.00-13.25
Mixed turnings, dry	13.00
Pots and pans	12.25-12.50
Low copper	14.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18 —18½
No. 2 heavy copper and wire	17 —17½
Light copper	16 —16½
Auto radiators (unsweated)	11¾—12
No. 1 composition	14¾—15
No. 1 composition turnings	14½—14½
Clean red car boxes	13¼—13½
Cocks and faucets	13¼—13½
Mixed heavy yellow brass	10 —10¼
Old rolled brass	11¼—11½
Brass pipe	13¼—13½
New soft brass clippings	14¾—15
Brass rod ends	12¾—13
No. 1 brass rod turnings	12½—12¾

Aluminum

Alum. pistons and struts	7 — 7½
Aluminum crankcases	9½—10
2S aluminum clippings	12 —12½
Old sheet and utensils	9½—10
Borings and turnings	6½
Misc. cast aluminum	9½—10
Dural clips (24S)	9½—10

Zinc

New zinc clippings	10 —10½
Old zinc	7¾— 8
Zinc routings	5¼— 5½
Old die cast scrap	5½— 5¾

Nickel and Monel

Pure nickel clippings	36 —39
Clean nickel turnings	32 —35
Nickel anodes	36 —39
Nickel rod ends	36 —39
New Monel clippings	15 —19
Clean Monel turnings	10 —14
Old sheet Monel	14 —18
Inconel clippings	22 —26
Nickel silver clippings, mixed	9 —10
Nickel silver turnings, mixed	6 — 7

Lead

Soft scrap, lead	9¾—10
Battery plates (dry)	5½— 5¾

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	68 —70
No. 1 pewter	48 —50
No. 1 auto babbitt	43 —45
Mixed common babbitt	9¾—10
Solder joints	13½—14
Siphon tops	43 —45
Small foundry type	13 —13½
Monotype	12 —12½
Lino. and stereotype	11 —11½
Electrotype	9¾—10
New type shell cuttings	15 —15¼
Hand picked type shells	6 — 6½
Lino. and stereo. dross	4¼— 4¾
Electro. dross	2¾— 3

UNIVERSITY OF MICHIGAN LIBRARIES

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Scrap Marches Again; Steel Grades Lead

The scrap market has not only come back to life, but it has done so with a red-hot burst of activity. Prices are up in practically all markets and No. 1 heavy melting steel showed increases of up to $4.00 per ton.

This is partially caused by increased mill buying, partially by brokers climbing all over themselves to cover old orders, and partially by the fact that only a little scrap is coming into dealers' yards. Mills are resisting the increases but they all need scrap for the record melt.

Los Angeles and Seattle prices took quite a jump during the past week and it seems that a shortage of openhearth grades is in evidence on the West Coast. Increased imports to that area are expected to alleviate this scarcity.

Price boosts were not restricted to steelmaking grades but almost all items displayed the strengthened trend, despite the continuance of vacation schedules and hot weather.

PITTSBURGH—Prices of practically all grades advanced in a strong but confused market here. No. 1 heavy melting steel is quotable at $43.00 to $44.00, based on a sale last week at $43.00 and brokers' buying prices at press time. But a sale of a representative tonnage of No. 1 bundles at $45.00 is the real indicator of the market's strength. Mills are resisting price advances in the face of a terrific melt and a demand that seems to be temporarily in excess of supply. Railroad heavy melting is quoted at $46.00 to $46.50, based on closing of a major list last week, but the tonnage did not come into the Pittsburgh district.

CHICAGO—The market here is stronger in almost all items. Brokers are paying $38.00 and $36.00 a ton for No. 1 and No. 2 steel respectively. Railroad No. 1 steel is stronger on the basis of actual sales in neighboring districts. On appraisal of all factors the prices of all openhearth steelmaking grades are higher.

PHILADELPHIA — The scrap market moved up sharply last week, even without any new mill buying. Openhearth grades are $2.50 to $3.00 higher on broker buying. Turnings moved up $1.00 to $2.00. It is understood that the west is buying blast furnace. Low phos grades were up $1.00 to $3.00. Railroad specialties and crop rails were up $2.00. Machinery cast was up $1.00. Malleable was up $1.00, and carwheels up $1.50. The plant vacation shutdowns are reducing yard intake. But orders still call for two tons of steel for one ton of bundles.

NEW YORK — The market here has come back to life with a surge of scrambling by brokers, both on old orders and some new ones. Steel grades are drawing the most interest and are $1.00 higher. Turnings are up 50¢, short shovelings are $1.50 stronger and all cast items have moved up 50¢ in sympathy. One of the causes of this added broker activity is that scrap is not coming into dealers' yards in the quantities needed.

DETROIT—The Detroit scrap market continues to show unmistakable signs of strength and this week's prices are up from 50¢ to $1.50 for some grades. With the reasonable expectation that the auto industry will continue for another month or two in the top production range, some of the wild speculation about the Detroit market seems to have quieted down although there is still much price control talk that has helped to create an uneasy situation.

CLEVELAND—Only brake on a runaway market here and in the Valley this week is the threat of price control. No. 1 heavy melting steel, after an appraisal of all factors, including a sale at a reported $43.00 last week, and brokers' buying prices, is quotable at a top of $45.00. Some mills are trying to counter the trend by buying only specific tonnages, but some of the buyers are getting fractious, faced with the new competition of foundries for the choice grades. A popular theory in the trade at the moment is that control will not be framed until the market reaches $50.00 for openhearth grades which, at the present rate of advance, should not be far off. But more than a need for controls, the present market would seem to indicate that the last price break was unjustified, and unrealistic.

ST. LOUIS—Steel mills are buying only small lots and using caution for fear of controls. A chemical company's purchases have upped turnings again. Foundries are again in the market and there has been a strong demand with higher prices expected for railroad specialties as the railroads show a tendency to get more use of their equipment and less dismantling.

CINCINNATI—A red hot market is under way here with some district consumers coming in for tonnage. Dealers are not selling freely and brokers are doing their best not to be short; prices are fluctuating faster than an automatic transmission. Foundry grades have firmed up pricewise and have moved to new levels faster than the openhearth grades in this district.

BOSTON—Prices of scrap are up all along the line here despite the fairly inactive market. Only a trickle of material is flowing. No. 1 steel, bundles, machine shop turnings, and heavy breakable cast are all 50¢ per ton higher; and No. 2 steel, and short shovelings rose $1.00.

BIRMINGHAM—The market here had been strong despite the fact that little buying was done last week. Then, as expected, some of the larger consumers, who had just about run out of scrap, came back into the market on Monday. This brought about several upward price changes. Some dealers are still receiving orders purchased more than a month ago.

BUFFALO — Underlying strength is in evidence as the mills express a willingness to accept orders within prevailing ranges, but dealers refuse to sell. Firming tendencies are coupled with uncertainty over what Washington intends to do. Prices are unchanged. While dealers are covering old commitments, the flow of new material, induced by present prices, is pared to a minimum. This makes dealers reluctant to take on new business at present prices.

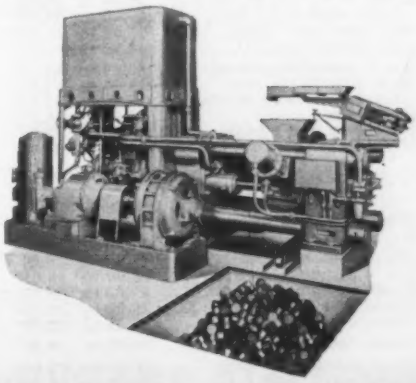
HANGS IN THE BALANCE!

Convert Bulky Scrap into Profitable Briquettes

Balance between ***profit*** and ***loss*** in the reclamation of scrap lies in a MILWAUKEE Hydraulic Briquetting Press. Cast iron, steel, brass, magnesium, bronze, and aluminum turnings, borings, and chips can be converted into compact, uniform, solid cylindrical blocks quickly and easily with little or no loss. These briquettes, identical in size and weight, reduce scrap handling and storage problems to a minimum. Classified as high-grade scrap, briquettes can be charged into furnace or cupola more readily and with greater economy than loose scrap.

Leading manufacturers of automobiles, heavy-duty mobile equipment, farm implements, aircraft, plumbing supplies, auto parts, pumps, and other high-production products currently are briquetting their scrap profitably. Many have increased self-sufficiency by reducing their dependence on outside scrap sources.

Of primary importance, also, is the fact that many of these plants have written off the *entire cost* of a MILWAUKEE Briquetting Press in one year or less. Write today for BULLETIN No. 117 to obtain complete specifications on available sizes of MILWAUKEE Briquetting Presses.



SPO

MILWAUKEE *Foundry Equipment Division*

CASTINGS ARE PERMANENT

6461 Grand Division Avenue • Cleveland 5, Ohio

Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	35.50 to 36.00
No. 1 bundles	44.50 to 45.00
No. 2 bundles	34.50 to 35.00
Machine shop turn.	30.50 to 31.00
Mixed bor. and ms. turns.	30.50 to 31.00
Shoveling turnings	35.50 to 36.00
Cast iron borings	34.50 to 35.00
Low phos. plate	46.50 to 47.00
Heavy turnings	40.50 to 41.00
No. 1 RR. hvy. melting	46.00 to 46.50
Scrap rails, random lgth.	45.50 to 46.00
Rails 2 ft and under	48.00 to 49.00
RR. steel wheels	47.00 to 48.00
RR. spring steel	47.00 to 48.00
RR. couplers and knuckles	47.00 to 48.00
No. 1 machinery cast	44.50 to 45.00
Mixed yard cast.	39.50 to 40.00
Heavy breakable cast.	36.50 to 37.00
Malleable	47.00 to 48.00

Chicago

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 factory bundles	38.00 to 39.00
No. 1 dealers' bundles	38.00 to 39.00
No. 2 dealers' bundles	31.00 to 32.00
Machine shop turn.	26.00 to 26.50
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	27.00 to 28.00
Low phos. forge crops	44.00 to 45.00
Low phos. plate	43.00 to 44.00
No. 1 RR. hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	48.00 to 49.00
Rerolling rails	51.00 to 52.00
Rails 2 ft and under	52.00 to 53.00
Locomotive tires, cut	45.00 to 46.00
Cut bolsters & side frames	44.00 to 45.00
Angles and splice bars	47.00 to 48.00
RR. steel car axles	58.00 to 60.00
RR. couplers and knuckles	45.00 to 46.00
No. 1 machinery cast.	47.00 to 48.00
No. 1 agricul. cast.	44.00 to 45.00
Heavy breakable cast.	39.00 to 40.00
RR. grate bars	36.00 to 37.00
Cast iron brake shoes	38.00 to 39.00
Cast iron car wheels	41.00 to 42.00
Malleable	49.00 to 50.00

Philadelphia

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	28.50 to 29.50
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	27.00 to 28.00
Low phos. punchings, plate	40.00 to 41.00
Low phos. 5 ft and under	40.00 to 41.00
Low phos. bundles	37.00 to 38.00
Hvy. axle forge turn.	35.00 to 36.00
Clean cast chem. borings	34.00 to 35.00
RR. steel wheels	42.00 to 43.00
RR. spring steel	42.00 to 43.00
Rails 18 in. and under	46.00 to 47.00
No. 1 machinery cast	40.00 to 41.00
Mixed yard cast	34.00 to 35.00
Heavy breakable cast	36.00 to 37.00
Cast iron carwheels	42.00 to 43.00
Malleable	45.00 to 46.00

Cleveland

No. 1 hvy. melting	$40.50 to $41.00
No. 2 hvy. melting	35.50 to 36.00
No. 1 busheling	40.50 to 41.00
No. 1 bundles	40.50 to 41.00
No. 2 bundles	28.00 to 28.50
Machine shop turn.	27.50 to 28.00
Mixed bor. and turn.	30.50 to 31.00
Shoveling turnings	30.50 to 31.00
Cast iron borings	30.50 to 31.00
Low phos. 2 ft and under	42.50 to 43.00
Steel axle turn.	40.50 to 41.00
Drop forge flashings	40.50 to 41.00
No. 1 RR. hvy. melting	46.00 to 46.50
Rails 3 ft and under	51.00 to 52.00
Rails 18 in. and under	54.00 to 55.00
No. 1 machinery cast.	49.00 to 50.00
RR. cast.	49.00 to 50.00
RR. grate bars	37.00 to 38.00
Stove plate	41.00 to 42.00
Malleable	49.00 to 50.00

Youngstown

No. 1 hvy. melting	$44.50 to $45.00
No. 2 hvy. melting	37.50 to 38.00
No. 1 bundles	44.50 to 45.00
No. 2 bundles	$34.50 to $35.00
Machine shop turn.	33.50 to 34.00
Shoveling turnings	35.50 to 36.00
Cast iron borings	35.50 to 36.00
Low phos. plate	45.50 to 46.00

Buffalo

No. 1 hvy. melting	$36.50 to $37.00
No. 2 hvy. melting	33.00 to 33.50
No. 1 busheling	33.00 to 33.50
No. 1 bundles	34.00 to 34.50
No. 2 bundles	31.00 to 31.50
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	28.00 to 29.00
Low phos. plate	38.50 to 39.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	45.00 to 47.00
RR. steel wheels	42.00 to 43.00
RR. spring steel	42.00 to 43.00
RR. couplers and knuckles	42.00 to 43.00
No. 1 machinery cast.	38.00 to 39.00
No. 1 cupola cast.	35.00 to 36.00
Small Indus. malleable	37.00 to 38.00

Birmingham

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	27.00 to 28.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	24.00 to 25.00
Bar crops and plate	38.00 to 42.00
Structural and plate	38.00 to 42.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	47.00 to 48.00
Rails 2 ft and under	47.50 to 48.50
Angles & splice bars	40.00 to 41.00
Std. steel axles	34.00 to 35.00
No. 1 cupola cast.	41.00 to 42.00
Stove plate	35.00 to 36.00
Cast iron carwheels	33.00 to 34.00

St. Louis

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	32.00 to 33.00
No. 2 bundled sheets	32.00 to 33.00
Machine shop turn.	21.50 to 22.00
Shoveling turnings	26.00 to 27.00
Rails, random lengths	39.00 to 41.00
Rails 3 ft and under	44.00 to 45.00
Locomotive tires, uncut	42.00 to 43.00
Angles and splice bars	45.00 to 46.00
Std. steel car axles	55.00 to 56.00
RR. spring steel	43.00 to 44.00
No. 1 machinery cast.	39.00 to 40.00
Hvy. breakable cast.	34.00 to 35.00
Cast iron brake shoes	36.00 to 38.00
Stove plate	33.00 to 34.00
Cast iron car wheels	39.00 to 40.00
Malleable	44.00 to 45.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	20.00 to 20.50
Mixed bor. and turn.	20.00 to 20.50
Shoveling turnings	22.50 to 23.00
Clean cast chem. bor.	28.00 to 29.00
No. 1 machinery cast.	31.50 to 32.50
Mixed yard cast.	29.50 to 30.00
Charging box cast.	29.50 to 30.00
Heavy breakable cast.	30.00 to 30.50
Unstrp. motor blocks	22.50 to 23.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	24.00 to 24.50
No. 1 bundles	29.50 to 30.00
No. 2 bundles	$23.50 to $24.00
Machine shop turn.	20.50 to 21.00
Mixed bor. and turn.	17.50 to 18.00
Shoveling turnings	23.00 to 23.50
No. 1 busheling	28.00 to 29.00
Clean cast chem. borings	23.00 to 24.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	27.00 to 28.00
Heavy breakable cast.	27.00 to 27.50
Stove plate	27.00 to 27.50

Detroit

Brokers' buying prices per gross ton, on cars

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.50 to 30.50
No. 1 bundles	38.00 to 39.00
New busheling	36.00 to 37.00
Flashings	35.50 to 36.00
Machine shop turn.	24.50 to 25.00
Mixed bor. and turn.	24.50 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	37.00 to 38.00
No. 1 cupola cast.	40.50 to 41.00
Heavy breakable cast.	32.50 to 33.00
Stove plate	34.50 to 35.00
Automotive cast.	44.00 to 45.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	32.50 to 33.00
No. 1 bundles	38.50 to 39.00
No. 2 bundles, black	32.50 to 33.00
No. 2 bundles, mixed	26.50 to 27.00
Machine shop turn.	22.50 to 23.00
Mixed bor. and turn.	23.50 to 25.00
Shoveling turnings	25.50 to 26.00
Cast iron borings	25.50 to 26.00
Low phos. 18 in. under	49.00 to 50.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	51.00 to 52.00
No. 1 cupola cast.	48.00 to 49.00
Hvy. breakable cast.	39.00 to 40.00
Drop broken cast.	50.00 to 51.00

San Francisco

F.o.b. shipping point:

No. 1 hvy. melting	$22.00
No. 2 hvy melting	20.00
No. 1 bundles	22.00
No. 2 bundles	17.00
No. 3 bundles	13.00
Machine shop turn.	9.00
Elec. fur. 1 ft and under	32.50
No. 1 RR. hvy. melting	22.00
Scrap rails, random lgth.	22.00
No. 1 cupola cast.	$32.50 to 34.00

Los Angeles

F.o.b. shipping point:

No. 1 hvy. melting	$23.50
No. 2 hvy. melting	21.00
No. 1 bundles	23.50
No. 2 bundles	18.50
No. 3 bundles	14.00
Mach. shop turn.	9.00
Elec. fur. 1 ft and under	35.75
No. 1 RR. hvy. melting	23.50
No. 1 cupola cast.	$39.00 to 41.50

Seattle

No. 1 hvy. melting	$24.00
No. 2 hvy. melting	24.00
No. 1 bundles	22.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Elec. fur. 1 ft and under	$29.00 to 30.00
RR. hvy. melting	25.00
No. 1 cupola cast	35.00
Heavy breakable cast.	25.00

Hamilton, Ont.

No. 1 hvy. melting	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed steel scrap	26.00
Mixed bor. and turn.	23.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bush., new fact, prep'd.	29.00
Bush., new fact, unprep'd.	23.00
Short steel turnings	23.00
Cast scrap	40.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Aug. 8, 1950	Aug. 1, 1950	July 11, 1950	Aug. 9, 1949
Hot-rolled sheets	3.35	3.35	3.35	3.25
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.25
Cold-rolled strip	4.21	4.21	4.21	4.038
Plate	3.50	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.35	6.35	6.35	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.45	3.45	3.45	3.35
Cold-finished bars	4.145	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.50	4.50	4.50	4.15
Rails: (dollars per 100 lb)				
Heavy rails	$3.40	$3.40	$3.40	$3.20
Light rails	3.75	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$54.00	$54.00	$54.00	$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	3.85	3.85	3.85	3.40
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Aug. 8, 1950	Aug. 1, 1950	July 11, 1950	Aug. 9, 1949
No. 2, foundry, del'd Phila.	$51.76	$50.42	$50.42	$50.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	49.08	49.08	49.08	45.47
No. 2, Birmingham	42.38	42.38	42.38	39.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	50.92	49.92	49.92	49.74
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$43.50	$41.75	$41.75	$21.00
Heavy melt'g steel, Phila.	35.50	32.50	32.50	17.50
Heavy melt'g steel, Ch'go	38.50	37.75	37.00	21.50
No. 1 hy. com. sh't, Det.	38.50	38.25	36.00	14.75
Low phos. Young'n	45.75	43.50	42.75	20.75
No. 1 cast, Pittsburgh	44.75	43.75	43.75	27.50
No. 1 cast, Philadelphia	40.50	39.50	38.50	27.50
No. 1 cast, Chicago	47.50	47.50	45.50	39.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.25
Foundry coke, prompt	16.25	16.25	16.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	22.50	22.50	22.50	17.625
Copper, Lake, Conn.	22.625	22.625	22.625	17.75
Tin, Straits, New York	99.00†	97.50*	84.75	$1.03
Zinc, East St. Louis	15.00	15.00	15.00	10.00
Lead, St. Louis	11.80	11.80	10.80	14.80
Aluminum, virgin	17.50	17.50	17.50	17.00
Nickel, electrolytic	51.22	51.22	51.22	42.93
Magnesium, ingot	22.50	22.50	21.50	20.50
Antimony, Laredo, Tex.	24.50	24.50	24.50	38.50

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

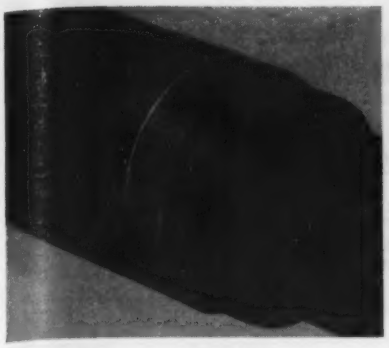
	Finished Steel Base Price	Pig Iron	Scrap Steel
Aug. 8, 1950	3.837¢ per lb.	$46.61 per gross ton	$39.17 per gross ton
One week ago	3.837¢ per lb.	46.38 per gross ton	37.33 per gross ton
One month ago	3.837¢ per lb.	46.38 per gross ton	37.08 per gross ton
One year ago	3.705¢ per lb.	45.91 per gross ton	20.00 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1950	3.837¢ Jan. 3	3.837¢ Jan. 3	$46.61 Aug. 8	$45.88 Jan. 3	$40.92 June 6	$26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07542¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

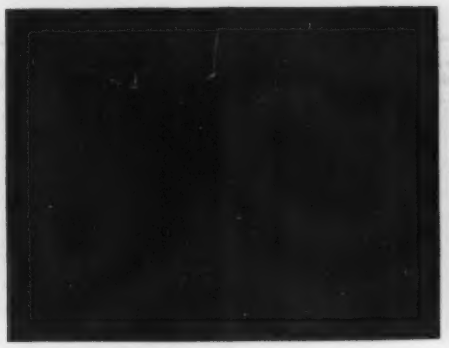
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

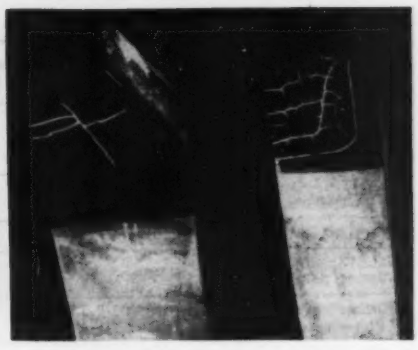
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.



Indications brought out by Magnaglo, glow under black light to clearly disclose a non-visible crack in car axle at wheel fit.



Magnaglo brings out a fluorescent indication, to locate typical crack in pinion gear of railroad diesel drive.



Zyglo brilliantly reveals cracks and poor bonding in these cutting tools. This method, like others employed with Magnaflux equipment is non-destructive and fast.

Luminous pattern by Magnaglo outlines forging crack in connecting rods shown above. Visual inspection would have missed this defect.

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Use Zyglo to establish quality control on the production line or during overhaul.

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Use Stresscoat where entire parts are tested for strain distribution under load or in use.

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Available for testing at production line speeds.

Magnaflux* equipment in a great variety of applications, shows up defects in a wide variety of materials. Whether cracks are caused by heat, fatigue, or corrosion, Magnaflux* locates and defines each defect clearly and in its entirety...at lowest cost and at production line speed. The result is immediately visible. Write for detailed information on your specific inspection problem.

WRITE FOR DETAILED INFORMATION ON YOUR SPECIFIC INSPECTION PROBLEM

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00[1]													$50.00[31]
Alloy, net ton	$51.00[1,17]													$51.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00[1]	$53.00[1]	$53.00[1]				$57.00[13]		$53.00[3]	$62.00[36]	$53.00[3]			
Carbon forging billets, net ton	$63.00[1]	$63.00[1,4]	$63.00[1,3]	$63.00[4]			$63.00[25]		$63.00[3,4]	$68.00[26]	$63.00[3]			$63.00[31]
Alloy, net ton	$66.00[1,17]	$66.00[1,4]	$66.00[1]		$66.00[4,42]		$66.00[13]	$66.00[3]	$66.00[3,4]	$70.00[26]	$66.00[3]			$66.00[31]
PIPE SKELP	3.15[1]						3.15[1,4]							
WIRE RODS	3.85[2,18]	3.85[2,4,33]	3.85[5]	3.85[2]			3.85[5]				3.85[3]	3.95[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35[1,5,9,15] 3.35[23]	3.35[23]	3.35[1,5,8]	3.35[4,5]			3.35[1,4,5] 3.50[13]		3.35[3]	3.45[26]		3.35[3]		3.55[12] 4.15[47]
Cold-rolled	4.10[1,5,7,9,15] 5.10[53]		4.10[1,5,8]	4.10[4,15]		4.10[7]	4.10[4,5]		4.10[3]			4.10[3]	4.30[22]	4.30[12]
Galvanized (10 gage)	4.40[1,9,15]		4.40[1,8]		4.40[4]		4.85[54] 4.75[44]					4.40[3]		
Enameling (12 gage)	4.40[1]		4.40[1,8]	4.40[4]		4.40[7]	4.40[5] 4.90[76]						4.60[22]	4.70[12]
Long ternes (10 gage)	4.80[9,15]		4.80[1]			4.80[7]	4.80[54]							
Hi Str. low alloy, h.r.	5.05[1,5,9]	5.05[1]	5.05[1,5,8]	5.05[4,5]			5.05[1,4,5,13]		5.05[3]	5.05[26]		5.05[3]		5.25[12]
Hi str. low alloy, c.r.	6.20[1,5,9]		6.20[1,5,8]	6.20[4,5]			6.20[4,5,12]		6.20[3]			6.20[3]		6.40[13]
Hi str. low alloy, galv.	6.75[1]											6.75[3]		
STRIP Hot-Rolled	3.25[5,7,9,39] 3.50[41]	3.25[3,65]	3.25[1,5,8]	3.25[5]			3.25[1,4,5] 3.50[13]		3.25[3]	3.35[26]		3.25[3]		3.45[12] 4.05[47]
Cold-rolled	4.15[5,7,9] 4.50[53]	4.30[3] 4.50[65]	4.30[3]	4.15[2,5]		4.15[7]	4.15[4,5,49,40] 4.50[13,40]		4.15[3]			4.15[3]		4.35[12] 4.75[59] 4.95[47]
Hi str. low alloy, h.r.	4.95[9]		4.95[1,5,8]	4.95[5]			4.95[1,4,5,13]		4.95[3]	4.95[26]		4.95[3]		5.15[13]
Hi Str. low alloy, c.r.	6.20[9]			6.20[2,5]			6.20[4,5,13]		6.40[3]			6.40[3]		6.40[13]
TINPLATE† Coke, 1.50-lb base box 1.25 lb, deduct 20¢	$7.50[1,5,9,15]		$7.50[1,5,8]				$7.50[4]					$7.60[3]	$7.70[22]	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30[1,5,15]		5.30[1,5]				5.30[4]					5.40[3]	5.50[22]	
BARS Carbon steel	3.45[1,5,9]	3.45[1,4,33]	3.45[1,5,8]	3.45[4]	3.45[4]		3.45[1,4,5]		3.45[3,4]		3.45[3]			3.65[12]
Reinforcing‡	3.45[1,5]	3.45[4]	3.45[1,5,8]	3.45[4]			3.45[1,4,5]		3.45[3,4]		3.45[3]	3.45[3]		
Cold-finished	4.10[5] 4.15[2,4,17,52,69,71]	4.15[2,33,69,70]	4.15[4,72,74]	4.15[2,61]	4.15[4,32,52]		4.15[5,49,57]		4.15[70]					4.35[12] 4.30[64]
Alloy, hot-rolled	3.95[1,17]	3.95[1,4,33]	3.95[1,5,8]		3.95[4]		3.95[1,5,25]	3.95[3]	3.95[3,4]		3.95[3]			4.25[12]
Alloy, cold-drawn	4.90[2,17,52,69,71]	4.90[2,33,69,70]	4.90[4,72,74]	4.90[2,61]	4.90[4,42,52]		4.90[5,25,57]	4.90[3]	4.90[3,70]					5.05[64]
Hi str. low alloy, h.r.	5.20[1,5]		5.20[1,5,8]	5.20[4]			5.20[1,5]	5.20[3]	5.20[3]		5.20[3]			5.40[12]
PLATE Carbon steel	3.50[1,5]	3.50[1]	3.50[1,5,8]	3.50[4]			3.50[1,13]		3.50[3]	3.60[26]	3.50[3]	3.50[3]		3.75[12]
Floor Plates	4.55[1]	4.55	4.55[3]	4.55[5]						4.55[26]				
Alloy	4.40[1]	4.40[1]	4.40[1]				4.40[13]			4.40[26]	4.40	4.40[3]		
Hi Str. low alloy	5.35[1,5]	5.35[1]	5.35[1,3]	5.35[4,5]			5.35[5]			5.35[26]	5.35[3]	5.35[3]		5.60[13]
SHAPES, Structural	3.40[1,5,9]	3.40[1,33]	3.40[1,5,8]					3.45[3]	3.45[3]		3.45[3]			
Hi Str. low alloy	5.15[1,5]	5.15[1]	5.15[1,5,8]				5.15[5]	5.20[3]	5.20[3]		5.20[3]			
MANUFACTURERS' WIRE Bright	4.50[2,5,15]	4.50[2,4,12,33,34]		4.50[2,77]			4.50[5]	Kokomo—4.60[30]			4.50[3]	4.60[3]	Duluth—4.50[3] Pueblo—4.75[14]	
PILING, Steel Sheet	4.20[1,9]	4.20[1]							4.20[3]					

Smaller numbers indicate producing companies. See key at right.
Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$76.00		INGOTS Carbon forging, net ton
	$88.00[83]		F=$77.00		Alloy, net ton
		$53.00[11]	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00[83]	$63.00[11]	F=$82.00[19]	Geneva=$63.00[16]	Carbon forging billets, net ton
	$74.00[83]		F=$85.00[19]		Alloy net ton
					PIPE SKELP
	4.25[83]	3.85[11]	SF=4.50[24] LA=4.65[24,62]	Portsmouth=3.85[30] Worcester=4.15[2]	WIRE RODS
		3.35[4,11]	SF, LA=4.05[24] F=4.25[19]	Ashland=3.35[7] Niles=3.50[64]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10[11]	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40[4,11]	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[80]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.05[11]	F=6.74[19]		Hi Str. low alloy, h.r.
			F=7.05[19]		Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.85[83]	3.85[83]	3.25[11]	SF, LA=4.00[24,62] F=4.40[19], S=4.25[83]	Ashland=3.25[7] Atlanta=3.40[65]	STRIP Hot-rolled
			F=5.75[19] LA=5.85[27]	New Haven=4.65[2], 5.90[68] Trenton=5.00[85]	Cold-rolled
		4.95[11]	F=6.64[19]		Hi Str. low alloy, h. r.
			F=6.95[19]		Hi Str. low alloy, c. r.
		7.60[11]	SF=8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb, deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Helleware enameling
4.05[83]	3.85[83]	3.45[4,11]	SF, LA=4.15[24] LA=4.18[83]	Atlanta=3.60[65]	BARS Carbon steel
4.05[83]	3.85[83]	3.45[4,11]	SF, S=4.20[83] F=4.10[19]	Atlanta=3.60[65]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55[83]	4.35[83]		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[2]=5.20 Hartford=5.20[4]	Alloy, cold-drawn
		5.20[11]	F=6.25[19]		Hi Str. low alloy, h.r.
	3.90[83]	3.80[4,11]	F=4.10[19] S=4.40[83] Geneva=3.50[16]	Claymont=3.60[29] Coatesville=3.60[21] Harrisburg=3.85[28]	PLATE Carbon steel
				Harrisburg=4.55[28]	Floor plates
			F=5.40[19]	Coatesville=4.50[21]	Alloy
		5.35[11]	F=5.95[19]	Geneva=5.35[16]	Hi Str. low alloy
4.00[83]	3.80[83]	3.40[11]	SF=3.95[62] LA=4.00[24,62]	Phoenixville=3.45[58] Geneva=3.40[16]	SHAPES, Structural
		5.15[11]	F=4.00[19] S=4.05[83]	Fontana=5.75[19] Geneva=5.15[16]	Hi Str. low alloy
5.10[83]	4.90[83]	4.50[4,11]	SF, LA=5.45[24,62]	Portsmouth=4.50[30] Worcester=4.80[2]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes deduct $1.15 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 John A. Roebling's Sons Co., Trenton, N. J.

UNIVERSITY OF MICHIGAN LIBRARIES

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	13.75	14.50	16.00	15.50	23.75	19.25	21.00	12.25	14.25	12.50
Slabs, billets, rerolling	18.00	19.25	21.25	20.25	31.25	25.50	27.75	16.60	19.50	16.25
Forg. discs, die blocks, rings	32.00	32.00	34.50	33.50	50.50	38.00	42.50	26.00	26.50	26.50
Billets, forging	25.75	25.75	27.75	27.00	40.50	30.50	34.25	21.00	21.50	21.50
Bars, wire, structurals	30.00	30.00	32.50	31.50	47.50	35.50	40.00	24.50	25.00	25.00
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	39.00	39.00	41.00	41.00	54.50	47.00	51.50	34.50	35.00	37.00
Strip, hot-rolled	25.50	27.00	31.25	29.00	47.25	35.75	40.00	22.50	29.25	23.00
Strip, cold-rolled	32.00	34.50	38.00	36.50	56.50	46.00	50.00	28.50	35.00	29.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38,39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	6.20
Electrical	6.70
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 15; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*; add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

MERCHANT WIRE PRODUCTS

To dealers, f.o.b. mill	*Base Column Pittsburg, Calif.*
Standard & coated nails* 106	125‡
Woven wire fence† 116	139
Fence posts, carloads†† 116	...
Single loop bale ties 113	137
Galvanized barbed wire** 126	146
Twisted barbless wire 126	146

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet; Johnstown, 112.

	Base per 100 lb	*Pittsburg, Calif.*
Merch. wire annealed‡	$5.35	$6.30
Merch. wire, galv.‡	5.60	6.55
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.
§ Torrance 126.

PRODUCING POINTS — *Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa., (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only). 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.

Fence Posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.40
Joint bars, per 100 lb	4.40
Light rails, per 100 lb	3.75

	Base Price cents per lb
Track spikes†	5.60
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Pittsburg, Torr., Calif.; Seattle	4.35
Track bolts, untreated	8.85
Track bolts, heat treated, to railroads	9.10

†Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 8; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4.

Track bolts: Lebanon, Pa., 8; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Indiana Harbor, Ind., 79; Johnstown, Pa., 3.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minneona, Colo., 14.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price about $200.00 per net ton

Standard, T & C

Steel, Buttweld*	*Black*	*Galv*
⅛-in.	40½ to 38½	21 to 19
¼-in.	43½ to 41½	25 to 23
1-in.	46 to 44	28 to 26
1¼-in.	46½ to 44½	28½ to 26½
1½-in.	47 to 45	29 to 27
2-in.	47½ to 45½	29½ to 27½
2½ to 3-in.	48 to 46	30 to 28
Steel, lapweld		
2-in.	38	19½
2½ to 3-in.	42	23½
3½ to 6-in.	43 to 40	24½ to 21½
Steel, seamless		
2-in.	36	17½
2½ to 3-in.	39	20½
3½ to 6-in.	41	22½
Wrought iron, buttweld		
⅛-in.	+26½	+56
¼-in.	+16½	+45
1 & 1¼-in.	+10½	+36
1½-in.	+ 4½	+32½
2-in.	+ 4	+32
Wrought iron, lapweld		
2-in.	+13½	+40
2½ to 3½-in.	+11	+35½
4-in.	+ 6	+29½
4½ to 8-in.	+ 8	+31
9 to 12-in.	+18	+40½

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	39½ to 37½	21½ to 19½
¼-in	43½ to 41½	25½ to 23½
1-in.	45½ to 43½	28½ to 26½
1¼-in.	46 to 44	29 to 27
1½-in.	46½ to 44½	29½ to 27½
2-in.	47 to 45	30 to 29
2½ to 3-in.	47½ to 45½	30½ to 28½
Steel, lapweld		
2-in.	37	19½
2½ to 3-in.	42	24½
3½ to 6-in.	44½ to 41½	27 to 24
Steel, seamless		
2-in.	35	17½
2½ to 3-in.	38	21½
3½ to 6-in.	42½	25
Wrought iron, buttweld		
⅛-in.	+22	+50
¼-in.	+15½	+43
1 to 2 in.	+ 5½	+32
Wrought iron, lapweld		
2-in.	+10½	+36½
2½ to 4-in.	+ 1	+25
4½ to 6-in.	+ 5	+29½
7 & 8-in.	list	+24½
9 to 12-in.	+11½	+32½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld lapweld steel pipe, jobbers are granted a discount of 5 pct.
* Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

OD in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$20.61	$24.24	$19.99	23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.38	37.36	43.99
4	10	47.82	56.25	46.39	54.56

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (°), add 15¢; Philadelphia, add 25¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (18 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.15	6.39[1]	6.55[2] 6.65	5.35–5.55[11]	....	5.40–6.04[11]	5.69	5.60	6.19	9.69	9.99	11.12	11.49
Birmingham°	5.15[10]	5.95	6.15[7]	5.10	....	5.40	5.25	5.10	5.85	....	....	....	....
Boston	5.75	6.55[10]	6.94[8] 7.14	5.70	6.90–6.95	6.08	5.75	5.60	6.19–6.89	9.70–9.97	9.50–10.00	11.15	11.45
Buffalo	5.15	5.95	6.94	5.41	7.27	5.65	5.35	5.15	5.75	9.90	9.90	11.05	11.35
Chicago	5.15	6.20	6.85	5.10	6.30	5.40	5.25	5.10	5.85	9.25	9.55	10.70	11.00
Cincinnati°	5.42–5.97	5.99–6.24	6.39	5.35	....	5.79	5.64	5.35–5.54	5.96–6.25	9.60–9.81	9.90–10.11	11.05–11.28	11.35–11.56
Cleveland	5.15	5.95	7.00–7.10	5.24	6.35	5.52	5.37	5.12	5.75	9.36	9.66	10.81	11.11
Detroit	5.33	6.09–6.33	7.09	5.49	6.43–6.60	5.59	5.64–5.68	5.39	5.91	9.56	9.86	11.01	11.31
Houston	6.00	....	....	6.10	....	6.00	5.95	6.10	7.80	10.35–10.45	10.50–10.60	11.50	11.96–12.10
Indianapolis	....	....	....	....	7.36	....	....	....	6.15	....	....	....	....
Kansas City	5.75	6.55	7.45	5.70	6.95	6.00	5.85	5.70	6.35	9.85	10.15	11.30	11.60
Los Angeles	5.90	7.45	8.00[2]	5.95	8.70[16]	6.00	5.90	5.90	7.55	10.75	10.75	12.45	12.75
Memphis	5.93	6.68	....	5.98	6.80–6.51	6.08	5.93	5.68	6.51	....	....	....	....
Milwaukee	5.29	6.09	6.94–6.99	5.24	6.32	5.54	5.39	5.24	5.89	9.39	9.69	10.84	11.14
New Orleans°	5.50[1]	6.75 6.85[1]	....	5.55[1]	6.80 6.90[1]	5.65	5.55[1]	5.55[1]	6.75 6.80	....	....	....	....
New York	5.55	6.80[1]	7.20[2]	5.84	6.76	5.90	5.65	5.75	6.44	9.80	9.90	11.05	11.35
Norfolk	6.10[13]	7.00	....	6.30[13]	....	6.15[13]	6.20[13]	6.15[13]	7.20[13]	....	....	....	....
Philadelphia°	5.30	6.35 6.45	6.80 6.85[2]	5.65	6.29	5.65	5.45	5.65	6.21	9.35	9.65	10.80	11.10
Pittsburgh	5.15	5.95	6.60	5.20	5.95–6.00	5.35	5.25	5.10	5.75	9.25	9.55	10.70	11.00
Portland	6.60–7.10[1]	8.40[2]	....	6.85[9]	....	6.40[9]	6.50	6.45–6.45[9]	8.60[14]	12.00[15]	11.60[15]	....	....
Salt Lake City	5.85	6.70	....	7.45	8.75	6.10[3]	5.90	7.35[5]	8.75	....	....	....	....
San Francisco°	6.20	7.60[2]	7.65[2]	6.15	7.85[16]	6.10	6.00	6.00	7.55	10.75	10.75	12.45	12.75
Seattle	6.60[4]	8.15[2]	8.40[2]	6.85[4]	....	6.35[4]	6.20[4]	6.35[4]	9.50[14]	....	11.60[15]	....	13.90[19]
St. Louis	5.48	6.22	7.18	5.43	6.68–7.54	5.73	5.58	5.43	6.08	9.58	9.88	11.03	11.33
St. Paul°	5.71	6.51	7.41	5.66	6.16–6.82	5.96	5.81	5.66	6.31	9.81	10.11	11.28	11.56

BASE QUANTITIES: *(Standard unless otherwise keyed on prices.)* Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 200 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 2999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	41.88	42.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Daingerfield, Tex.	41.50	42.00	42.00	.....	.....
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.50	51.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Pittsburgh	46.00–51.00	46.50–49.50	46.50–49.50	47.00–50.00	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	46.00	46.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	50.00	50.50	51.00	51.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.58 Arb.	.....	50.90	51.00	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	60.90
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	48.58	49.08	.....	.....	.....
Jersey City	Bethlehem	2.83	.....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	51.44	51.94	52.44	52.94	.....
Philadelphia	Steelton	3.09	51.09	51.59	52.09	52.59	57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63	.....	.....
San Francisco	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58	.....	.....

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$57.00; f.o.b. Buffalo, $58.25. Add $1.00 per ton for each additional 0.50 pct $1 up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)
Base discount

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	27	38
9/16 & ⅝ in. x 6 in. & shorter	29	40
¾ in. & larger x 6 in. & shorter	26	37
All diam, longer than 6 in.	22	34
Lag, all diam, longer than 6 in.	28	39
Lag, all diam x 6 in. & shorter	30	41
Plow bolts	40	—

Nuts, Cold Punched or Hot Pressed

(Hexagons or Square)

½ in. and smaller	25	37
9/16 to ⅝ in.	23	35
¾ to 1½ in. inclusive	23	35
1⅝ in. and larger	16	29

Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List Reg	Hvy	Lt
½ in. and smaller	41	35	41
9/16 to ⅝ in.	36	30	36
¾ to 1½ in.	31	27	33
1⅝ in. and larger	21	17	..

In full case lots, 15 pct additional discount.

Stove Bolts

	Pct Off List
Packaged, steel, plain finish	63
Packaged, plated finish	50
Bulk, plain finish**	69*

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa. $7.25

Small Rivets

(7/16 in. and smaller)
Pct Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 43

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	60
¼ in. through ⅝ in. x 6 in. and shorter high C heat treated	54
Milled studs	23
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter	59

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.50¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
GRAPHITE		
17, 18, 20	60, 72	17.00¢
8 to 16	48, 60, 72	17.00¢
7	48, 60	18.64¢
6	48, 60	19.65¢
4, 5	40	20.48¢
3	40	21.53¢
2½	24, 30	22.05¢
2	24, 30	24.15¢
CARBON		
40	100, 110	7.65¢
35	65, 110	7.65¢
30	65, 84, 110	7.65¢
24	72 to 104	7.65¢
20	84, 90	7.65¢
17	60, 72	7.65¢
14	60, 72	8.16¢
10, 12	60	8.42¢
8	60	8.67¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa. (21)	*26.50	
Washgtn, Pa. (39)	*26.50	
Claymont, Del. (25)	*26.50	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct, Coatsville (21)	31.00	
Inconel-carbon		
10 pct, Coatesville (21)	39.00	
Monel-carbon		
10 pct, Coatsville (21)	32.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		75.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

* Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.565
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium	57.5¢
Oil hardened manganese	32¢
Special carbon	29.5¢
Extra carbon	24.5¢
Regular carbon	21¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$24.00
Chicago, f.o.b.	21.00
Detroit, f.o.b.	20.40
New England, del'd	23.40
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	21.25
Swedeland, Pa., f.o.b.	21.20
Painesville, Ohio, f.o.b.	21.90
Erie, del'd	$21.04 to 21.25
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	21.00
St. Louis, del'd	22.13
Birmingham, del'd	20.20

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net; Effective CaF, content:

70% or more	$39.00
60% or less	36.00

REFRACTORIES

(F.o.b. works)

Fire Clay Brick	Carloads, Per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$86.00
No. 1 Ohio	80.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	80.00
No. 2 Ohio	72.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	14.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$86.00
Childs, Pa.	90.00
Hays, Pa.	91.00
Chicago District	95.00
Western Utah and Calif.	101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago	106.00
Silica cement, net ton, bulk, Eastern (except Hays Pa.)	15.00
Silica cement, net ton, bulk, Hays, Pa.	17.00
Silica cement, net ton, bulk, Ensley, Ala.	16.00
Silica cement, net ton, bulk, Chicago District	16.00
Silica cement, net ton, bulk, Utah and Calif.	22.50

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Chester	$72.00

Magnesite Brick

Standard, Baltimore	$94.00
Chemically bonded, Baltimore	83.00

Grain Magnesite	8t. ⅜-in. grains
Domestic, f.o.b. Baltimore, in bulk fines removed	$56.00 to $57.00
Domestic, f.o.b. Chewelah, Wash., in bulk	32.00
in sacks	38.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	29.00¢
Brass, 10 ton lots	27.75¢ to 31.25¢
Copper, electrolytic	9.25¢ plus metal value
Copper, reduced	9.75¢ plus metal value
Cadmium, 100-199 lb	$2.95
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	$2.00
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	24.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$2.90
Zinc, 10 ton lots	20.50¢ to 23.85¢

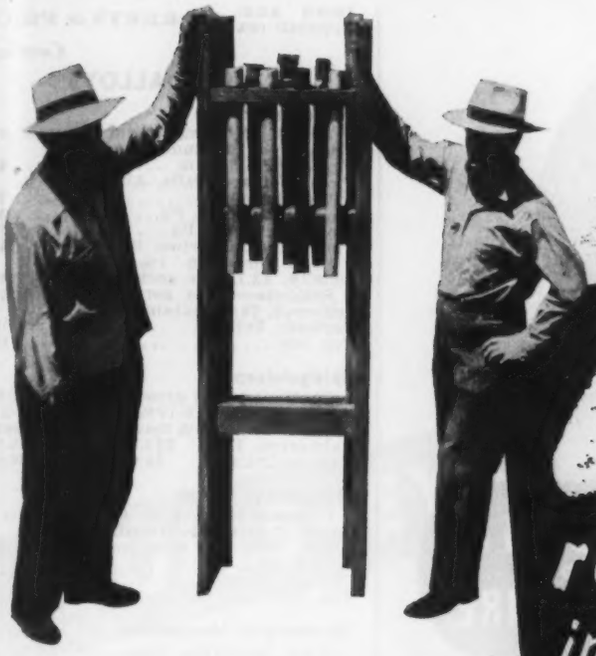
CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago	$91.80 to $95.30
6 to 24-in., del'd N. Y.	91.00 to 92.00
6 to 24-in., Birmingham	78.00 to 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$108.50 to $113.00

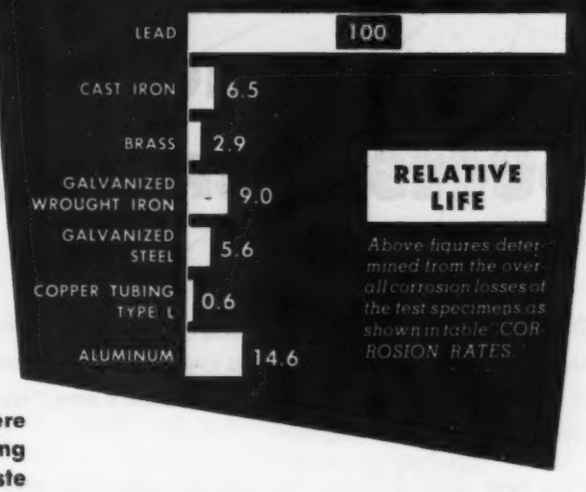
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

Prices Continued on Page 126



The wooden rack assembly supporting the seven pieces undergoing tests in the manhole.

LEAD rates highest in corrosion test of waste pipe materials



IN A RECENT TEST of various pipe materials used or suggested for soil, waste and vent lines, conducted under accelerated conditions in Fort Worth, Texas, lead pipe proved to be outstanding, having a relative life expectancy of more than six times that of the next closest material tested.

The test specimens were 2 ft. sections of pipe and conformed to established plumbing size specifications. The samples were placed in a wooden rack which was placed in a manhole carrying the return sludge from the Fort Worth sewage disposal plant's aeration basin. The specimens were kept 18 in. above the water line. Analyses showed the sewage to be alkaline, the condensed moisture on the samples acid and the surrounding atmosphere to contain hydrogen sulphide. Although the conditions of the test — being accelerated — were more stringent than usually found in the plumbing system, all of them are present in the ordinary waste system to a lesser degree.

The duration of the test was one year and the table below shows the corrosion rates of the various pipe materials tested.

CORROSION RATES *Data from "Comparative Corrosion Study of Soil, Waste and Vent Pipe Materials" by John D. Kane, Chief Plumbing Inspector, Dept of Public Works, Fort Worth, Texas, presented at the 1949 Annual Convention of the American Society of Sanitary Engineering.*

MATERIAL	WEIGHT LOSS OZ./SQ. IN./YR.	VOLUME LOSS IN. PENETRATION/YR.
LEAD	0.00167	0.000259
CAST IRON	0.02510	0.005540
BRASS	0.04910	0.009660
GALVANIZED WROUGHT IRON	0.01370	0.003022
GALVANIZED STEEL	0.02160	0.004758
COPPER TUBING TYPE L	0.10150	0.019720
ALUMINUM	0.00270	0.001825

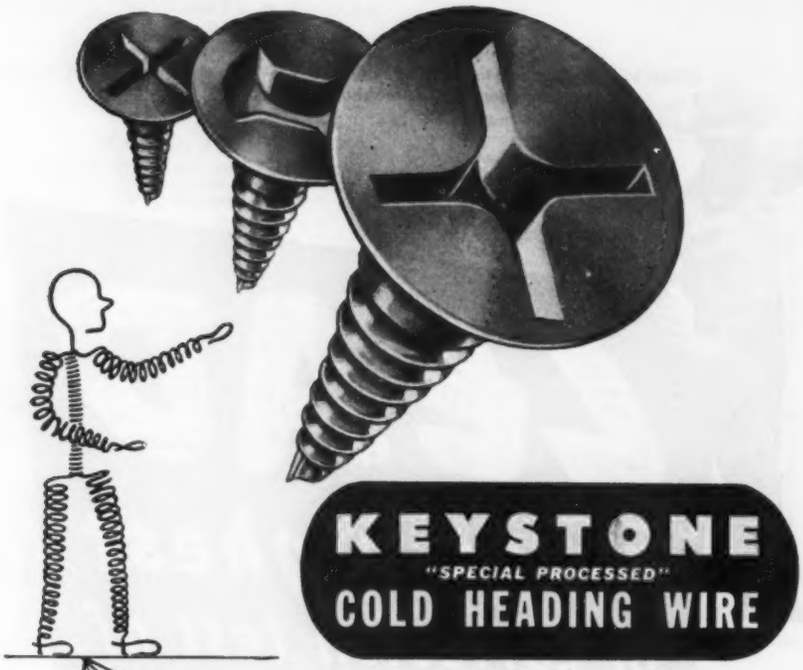
Furthermore, lead was the only metal not affected by pitting. All the other materials were pitted in varying degrees with one of the most commonly used competitive metals having pitted completely through the wall of the tubing.

The results of the test prove conclusively that for the conditions encountered in soil, waste and vent lines, lead is, by far, the most enduring pipe material.

ST. JOSEPH LEAD CO.

250 PARK AVENUE, NEW YORK 17

THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES



EXCELLENT FLOW PROPERTIES

PROLONGS DIE LIFE

FEWER REJECTIONS

REDUCES INSPECTIONS

To attain true economy in the production of Phillips head and clutch head screws, an ever increasing number of manufacturers are specifying Keystone's new "special processed" cold heading wire.

This new wire delivers the desired upsetting and die forming qualities with a high degree of uniformity due to its excellent flow properties. Production reports show that die and plug life are often more than doubled . . . finished product rejections are minimized . . . the cost of expensive final inspections is reduced. The superior plating qualities of "special processed" wire further assure a better finished product.

Whatever your industrial wire problems might be, Keystone metallurgical research and testing facilities are available to supply the answers.

KEYSTONE
STEEL & WIRE CO.
PEORIA . . . ILLINOIS

Special Analysis Wire, Setting New Standards of Performance

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn. 18.15¢

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	17.00	75% Si	13.50
50% Si	11.30	85% Si	14.65
90-95% Si			16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Prices Continued on Page 128

BULLS-EYE!

FEDERAL GAGES have a way of winning friends . . . but no other Federal Gage has ever won such immediate and tremendous acclaim as the Model 1000 Series Snap Gage. It's a hit! Today, after less than a year on the market, this inspection tool has already gone to work for every type of production industry where dimensional control counts — in every part of the country. The way Model 1000 Series Indicating Snap Gage has been accepted proves we accomplished what we set out to do: **To build a Gage that's way out in front and at a price that's right!** If you haven't tried it on your own work, you're missing a mighty good bet. Write for complete details today.

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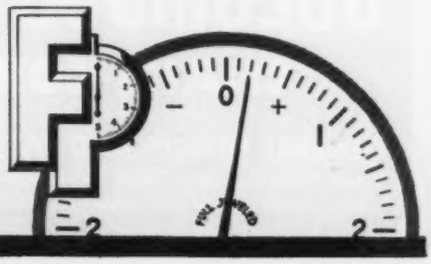

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Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max Si.)

0.06% C	28.75	0.20% C	27.75
0.10% C	28.25	0.50% C	27.50
0.15% C	28.00	1.00% C	27.25
2.00% C			27.00
65-69% Cr, 4-9% C			20.50
62-66% Cr, 4-6% C, 6-9% Si.			21.35

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contrast price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C	1.06
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si.

Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

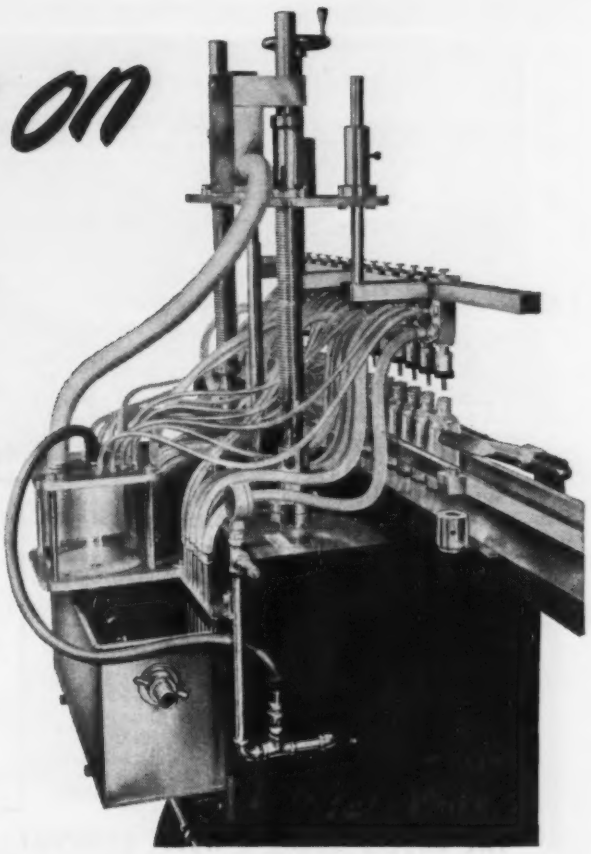
Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

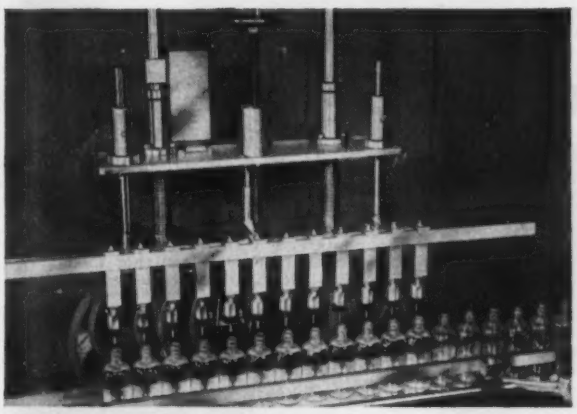
Ton lots	17.25
Less ton lots	18.50

Prices Continued on Page 130

Liquids on Tap

because stainless steel is, too!





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The nature of each liquid to be filled requires that every machine be custom built, normally a headache in materials procurement. The illustrated machine, for instance, uses stainless steel nipples, unions, plates, sheets, angles, rounds, flats, squares, hexes, screws, nuts, seamless tube, and pipe.

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Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
- Carload ..... 7.65¢
- Ton lots ..... 9.05¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo ..... 96¢

Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.
- Ton lots $3.50
- Less ton lots 3.55

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $2.67

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.13

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.28

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.40
Less ton lots $1.45

Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $167.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $2.25

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
- Openhearth $2.90
- Crucible 3.00
- High speed steel (Primos) 3.10

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. ..... 95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa. ..... 94¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
- Carload, bulk, lump ..... 11.00¢
- Ton lots, bulk, lump ..... 11.50¢
- Less ton lots, lump ..... 12.25¢

Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.20

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
- Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
- Carload, bulk ..... 6.60¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B $4.25

Bortam, f.o.b. Niagara Falls
- Ton lots, per pound ..... 45¢
- Less ton lots, per pound ..... 50¢

Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
- Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.39
F.o.b. Wash., Pa.; 100 lb, up
- 10 to 14% B ..... .75
- 14 to 19% B 1.20
- 19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
- No. 1 ..... 93¢
- No. 6 ..... 63¢
- No. 79 ..... 45¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.
- Ton lots $1.46
- Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
- Less ton lots $1.80

Silcaz, contract basis, delivered.
- Ton lots ..... 45.00¢

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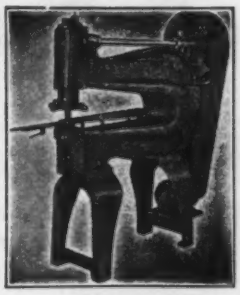

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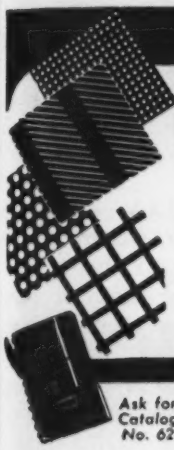

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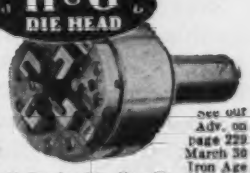

See our Adv. on page 229 March 30 Iron Age

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Bar Shears, Open & Guillotine, ⅝" to 7" Rd.
Ferracute #6 Solid Back Geared Press, 100-ton
Minster 88-ton S.S. Press. 16" stroke
Solid Back Presses, 20 to 100-ton
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Bliss Knuckle Joint Press, 250-ton
Single & Double End Punches, various throat depths and caps.
L. & A. Multiple Punch, 8', 150-ton
L. & A. Multiple Punch, 10', 350-ton
Ryerson Serpentine Throatless Shear, ½"
#416-C Niagara Circle & Slitting Shear, ¼"
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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Korean Influence—Reports this week indicate that the Korean situation is having an increasing but not yet substantial nor widespread effect on the used machinery business. The consensus is that it will be several months before increased defense procurement will directly influence used machinery sales. Dealers reason that it will take this time for prime defense orders to reach subcontracting levels in any great volume. However an unmistakable increase in inquiries and orders in recent weeks can probably be explained by two effects of the war situation.

Users who have been debating used equipment purchases for a long time are now having their minds made up by the thought that they'd better get their machines now while they still can. A second group responsible for increased market activity consists of buyers normally interested in new machinery, who are having their interest shifted to used machines by the increasingly extended delivery dates for many types of new machines.

Rebuilding Reserve Machines—Considerable concern is felt in the trade over the condition of the machine tools held in reserve by the armed forces. Available evidence indicates that Navy machine tool reserves are in fairly good condition since storage was well done and some rebuilding has been going on. But this is not true for Army and Air Force reserve tools. The trade feels that should war come, these tools will be badly needed, and some program should be getting underway now to insure that the reserve machines will be ready.

J.M.P. Fox of the MDNA is pointing out to Washington leaders that there is a large amount of rebuilding capacity and experience in used machinery plants throughout the country which is not being fully utilized.

Pittsburgh Market — Machine tool business has picked up here during the last month, but dealers attribute this more to improved business conditions generally than to concern over international developments. More inquiries are noted, and more deals are being closed. Heavier equipment, such as punches and shears, were in the forefront of July's increased demand. The demand for used and rebuilt steel mill equipment here was never better.

New York MDNA — Inactive during the summer, officers of the New York section of the MDNA are busy planning the fall program. Letters were recently sent to the non-member used machinery firms in the area, inviting them to send representatives to the first New York MDNA meeting in the fall.

Price Trend—As reported from Detroit, Cleveland, New York, and other major centers, the price trend on the newer models of all types of used machinery and machine tools is up. Prices on older equipment are firm in most areas, but are not rising substantially. Most dealers feel that prices had fallen so low, because of inactive business conditions, that there will be further upward adjustments as the demand for used machinery grows.

MDNA Convention — The national convention of the Machinery Dealers National Association, scheduled for May, 1951, will be held at the Drake Hotel in Chicago. Ed Johnson, Strom-Johnson Machinery Co., Chicago, is chairman of the convention committee. Members of the committee are Harold Goldstein, Charles Kempler, Eliot Blumberg, George Bernstein, and Robert Rice, all of Chicago. Mrs. Charles Kempler will make arrangements for ladies attending the convention.